GLEANINGS IN BEE CULTURE

A JOURNAL DEVOTED TO BEES AND HONEY AND HOME INTERESTS

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STRAY STRAWS FROM DR. C. C. MILLER.

IMMENSE CROPS but poor sale is the cry among bee-keepers in France.

ANNUAL INSURANCE for bees and bee-fixtures in Germany costs 3 mills on the dollar.

THAT MAN makes the best success in the long run in his vocation who has an avocation as well.

"QUIET ROBBING to stop robbing" is a heading on page 26. That's hardly the thing. Better put "prevent" in place of "stop."

YORK took a pretty big contract when he agreed to have a bee-keeper's picture every week of 1893, but he got there all right.

GLEANINGS looks quite gay with its new fix-ups. Funny that lead, which usually makes things heavier, makes a printed page lighter.

GRAVENHORST, editor *Illustrierte Bienenzeitung*, thinks we might learn something from German bee-keepers, and *vice versa*. *Ganz recht.*

LATHYRUS SILVESTRIS WAGNERI is a new honey-plant that's getting a boom across the water. I think it's some kind of a pea used for forage.

SUGAR FOR FEEDING, free from ultramarine, sulphur, and sulphuric acid, is advertised in foreign bee-journals. May be it would be a good thing here.

A SALVE much esteemed for ulcers and external sores is made by mixing equal parts of honey and flour with a very little water so as to make a stiff paste.

THAT'S A MEAN advantage Rambler takes of me on p. 20, in claiming that washing-recipe for the benefit of bachelors. Bet you he gets kerosene in his flapjacks.

HE LIKED the comb. Papa (*to little boy who has been at a party*): Well, my little man, what did you have that was nice?

Little Boy. Oh! we had honey, and it had chewing-gum in it.—*Harper's Young People.*

AUSTRIA has 1,550,000 colonies of bees; Germany, 1,450,000; France, 950,000; The Netherlands, 240,000; Belgium, 200,000; Russia, 110,000; Denmark. 90,000; Greece, 30,000.

THE OLD RELIABLE *A. B. J.* has so much foul brood in its columns nowadays that I have to wash my hands after reading it, for fear of getting the disease among my bees.

FRIEND ROOT, tell your "sun time" friends that you can get telegraph time every day, rain or shine, but they're in a bad fix if the clock stops and the sun doesn't shine for two weeks.

BRACE AND BURR COMBS, after several years' trial, have not appeared in a hive with top-bars 1⅛ x ⅞, spaced 1⅜, with ¼ space over top-bars, according to a report of O. G. Rislow, in *A. B. J.*

THOSE MUMMIES were quite a find, as told by Karl R. Mathey, p. 18; but isn't friend Mathey himself more of a find? I tell you, if we find out all those Germans know about bees we'll know a heap.

PILE REMEDY. One cupful honey, two tablespoonfuls sulphur and two of black pepper, mixed, and taken a tablespoonful at a dose, three times daily in bad cases.—*Rural New-Yorker.*

THAT LAST STRAW on page 7, that says, "1 out of 22 would keep the frames the same, summer and winter," should read "19 out of 22." Get some new harvest hands that can set up straw right.

MY FIRST CELLARING was with box hives. I turned them upside down, according to Quinby's advice. That made upward ventilation with a vengeance, and all closed below. My present practice is just the opposite. Either way is good if other things are right.

AN OLD SIGN that a colony is not queenless in spring is, to find the remains of wax-worms thrown on the floor of the hive. There may be a good deal in it, for a queenless colony will not clean out such things with much vigor.

MR. EDITOR, haven't you got things a little mixed on page 9? Herr Lehzen, and not Guenther, is the able editor of the *Centralblatt*, and

the Guenther referred to is, I think, the same Guenther who, more than a third of a century ago, was assistant to the Baron of Berlepsch, the champion of the Dzierzon theory.*

SKUNK-KILLING. "I take a small piece of comb containing drone brood, in which I insert a grain of strychnine. Place it in front of the hive, and you have got his skunkship sure. If you have no drone brood you can use worker brood."—*Gallup*, in *A. B. J.*

DOOLITTLE will surely be on time with his "Seasonable Questions," according to the picture at the top of them, with the sun on one side and a clock on the other, then an hour-glass on top, with a rooster back of it flapping its wings to wake him up in the morning.

DEXTRINE is not found in floral honey, but *is* found in honey gathered from the leaves of certain trees and from pines, and generally called honey-dew. According to an article in *Revue*, this honey-dew, on account of the dextrine, may possibly be more healthful than floral honey.

A STEAM WAX-EATRACTOR in Germany (the Winkler) claims to get 18 per cent of pure wax out of slumgum left by solar extractors, and 56 per cent out of old combs. The steam is formed in the extractor, which contains a screw press. When the material is heated, the press does its work without the chance of cooling.

DZIERZON says that, in an experience of more than 50 years, he has found no difference in the value of queens whether raised in pre-constructed or post-constructed cells, providing a larva not more than three days old is used. But the quality of the harvest affects the value of the queen, a queen raised during a yield of honey-dew being small and weakly.

DO BEES FERTILIZE FRUIT-BLOSSOMS?

A BRIEF SYMPOSIUM ON BOTH SIDES OF THE QUESTION.

[A short time ago there appeared in the *Rural New-Yorker* an excellent article from Dr. C. C. Miller, on bees and fruit, which was followed in a later issue by another article taking strong ground against what the doctor had said. We wrote to friend M., asking him if he were going to let the matter drop there. In reply we received the following note, asking information through GLEANINGS.—ED.]

The *Rural New-Yorker*, reliable paper that it is on all other subjects, had an item sneering at the idea that fruit-trees should not be sprayed when in bloom, suggesting that the bee-keeper should keep his bees at home. A reply was made, saying that, if the bee-keeper should keep his bees away, the fruit-grower wouldn't be troubled with spraying, for there wouldn't be enough fruit set to make it worth while to spray. Then L. E. R., of L., Nebraska, made a reply in which he says, "I lived several years in Wyoming; was engaged in the growing of vegetables, fruits, and flowers, for commercial purposes, and was in the seed business. We had no bees in that country until two years before I left there. We grew apples, crabs, raspberries, and strawberries, the latter in great quantities, of immense size and most excellent quality. Then our wild fruits—plums, cherries, and service-berries, bore year after year, the trees being literally loaded down with fruit. I left that favored clime, and came to what is termed the fruit-belt of Nebraska; but I want to tell you that we had more and better fruit in a day in Wyoming, where we had no bees to fertilize the blossoms, than I have seen here in two years, with an apiary at every second house."

I want to ask, through GLEANINGS, whether the experience and observation of others corroborate the foregoing statement. Were there no bees in Wyoming till four years ago? Did others have such crops of fruit as are mentioned, with no bees visiting the blossoms? We ought to seek the truth, whatever it may be, even if it upsets what has previously been supposed to be the truth. From my own observation, I have always supposed that bees aided the fertilization of pretty much all kinds of fruit; but I do not know that I ever saw them work to any extent on strawberries. Are they needed for strawberries? If any of our friends of Wyoming, or of the fruit-belt of Nebraska, can give us any light, I sha l be much obliged to have them write to me or to GLEANINGS.

Marengo, Ill. C. C. MILLER.

[The article in the *Rural*, together with a recent one by G. M. Doolittle, on page 915, GLEANINGS for Dec. 15, seems to have stirred up some little discussion among the brethren. Among others just received is the following, which we publish, not so much because it supports the side of the bee-keeper impartially, but because of the painstaking care the writer has used in obtaining the facts.]

BUMBLE-BEES AND CLOVER.

It is an idea often stated, that clover will not yield seed without the aid of bumble-bees, and that clover did not yield seed in Australia until bumble-bees were imported. I did not believe this, as plants were created first, and for the higher order of animal life, but so as to continue existence without animal aid. Therefore honey was primarily for the bee, and incidentally the bee helps the plant in gathering the honey. To find the facts, I made some observations and experiments.

*Perhaps so. At all events, we stand corrected.—ED.

In 1891 there were 1½ acres of medium red clover that came within 30 feet of my door, and, being confined to the house by sickness, I watched this field. There was the usual amount of rain until April 20; then there was no rain until June 1, so the clover-florets were shorter than usual, and the honey-bees worked on them as much as white clover. Still there were only few seeds. This clover was not a small growth, as it made two tons of dry hay per acre, first crop. When the second crop bloomed, there were the most bumble-bees I ever saw, as the best estimate I could make was that there was one to each ten feet square, making 4356 working at the same time on one acre. When the seed ripened, there was a large crop. This year, being still unable to walk, I rolled out into the yard in my wheel-chair, and made this experiment. July 21 I covered some clover-blossoms with netting. Part of the florets being open, I tied a small thread around the open ones. At the same time I gathered five heads of clover that were ripe, and 447 capsules gave 131 seeds. The bumble-bees had worked on these blossoms, there being few flowers when they bloomed. Aug. 14 I gathered the covered blossoms, also some on some plants not covered. Where the numbers are the same, they are part of the same head of clover.

No. 1	48	florets	open when covered	gave	30	seeds, or	62.5 %
No. 1	67	"	not open " "	"	35	" "	52.238 %
No. 2	113	"	not covered	"	68	"	60.177 %
No. 3	132	"	covered	"	100	" "	75.757 %
No. 4	145	"	not covered	"	123	" "	84.827 %
No. 5	63	"	open when covered	"	43	" "	68.254 %
No. 5	84	"	not open when covered	"	50	" "	71.428 %
No. 6	117	"	not covered	"	100	" "	85.47 %
No. 7	41	"	open when covered	"	31	" "	75.609 %
No. 7	85	"	not open when covered	"	36	" "	42.352 %
No. 8	140	"	covered	"	33	" "	23.571 %
No. 9	76	"	not covered	"	24	" "	31.578 %

Nos. 8 and 9 were on a plant about 50 feet from other clover-plants. Three heads, where 152 florets were open when covered, gave 104 seeds, or 68.421 %; 3 heads, where 236 florets were not open when covered, gave 111 seeds, or 47.033 %. Loss by covering, 21.388 %.

The total florets not covered, 527, gave 385 seeds, or 73.055 %. The total florets covered, 368, gave 211 seeds, or 57.337 %. Loss by covering, 15.718 %.

Alsike and peavine red clover yield seed from the first blossoms: therefore, it is the nature of the plant, and not lack of bees, that causes fewer seed in first blossoms of red clover. The later blossoms of red clover will yield seed without the aid of bumble-bees; but their work adds about 15 % to the yield. So the farmer who destroys all bumble-bees' nests is destroying a large part of his profit if he raises clover.

Bloomfield, Ind., Dec. 28. J. C. GILLILAND.

[This most valuable communication was followed again by a private letter from Mr. Doolittle, inclosing an article from Mr. W. S. Fultz, which the latter says we at one time refused to publish. We have no recollection of this; at any rate, as it seems to be a good one we are glad to give place to it at this time.]

ARE BEES NECESSARY TO THE PROPER FERTILIZATION OF FRUIT-BLOOM?

The assertion has often been made by horticultural journals and bee-papers, that the honey-bee is an essential to the perfect fertilization of fruit-bloom, and that, without the aid of bees, the fruit-grower could not carry on his business with any certainty of a crop, so that the public have got to believe that such is really the case. Bee-journals have been very persistent in asserting that, if there were no bees, there would be no fruit. This is especially the case whenever they hear of any fruit-grower charging that the bees have been destroying fruit.

In studying this question we naturally go back to the early history of the country, and we find that the first settlers of this country found in many places wild fruit growing in abundance. We also find that, in many parts of the country, there were nut-trees of various kinds that showered down their nuts each autumn, and that, within the almost boundless forests, there were trees of all sizes, from the tiny yearling to the giant monarch of the forest, showing conclusively that the nuts and seeds of the forest had been properly fertilized for centuries before the advent of the white man. History also informs us that the first white settlers of America found no honey-bees, and that the first bees introduced into this country came from Europe, and that they were the German or brown bee. What, then, was it that fertilized the wild-fruit bloom, the nut and other trees of the extensive forests of America, to say nothing of the corn, tobacco, and other crops that were raised by the Indians?

In discussing this question with bee-keepers they always refer me to the fact that there were bumble-bees, wasps, hornets, and other honey-gathering insects in the country; but when asked how many of these insects there were in each nest at the time when trees are usually in bloom, they were obliged to admit that the queen was the only one, and that it was utterly impossible that the extensive fertilization necessary could have been performed by them.

When the first settlers from the United States went to California they found various kinds of fruit growing there. Many of the old Spanish missions were noted for the fine fruits that were raised there. The same is also true of Oregon and Washington, and yet there were no honey-bees there. We have a true account of the first attempts that were made to introduce the honey-bee into the Pacific Slope. That account, if given, would make this paper too long, and is not germane to the subject. It is sufficient to say, that fruits of different kinds, both wild

and cultivated, were raised without the aid of the honey-bee. I might here add that the Mormons found the same state of affairs to exist in Utah that the early American settlers found on the Pacific Slope. So much for history, now for personal observation.

The winter of 1871 will long be remembered by the bee-keepers of that time as one of great disaster. Fully 75 per cent of all the apiaries of Eastern Iowa and Western Illinois were wiped out of existence, and the others were so decimated that, in nearly every case, not more than three or four hives of bees were left, and those were very weak during the early part of the following summer. Several apiaries with which I was acquainted, that had contained 100 hives of bees and over, were entirely wiped out of existence, and bee-keepers in Muscatine Co., Iowa, and in the adjoining county of Mercer, in Illinois, sent to Western Kentucky for a supply of bees to get a new start. These bees were not brought until after fruit-bloom. The cause of the great mortality to bees was said to be poisoned honey that had been gathered by them during the previous summer. In the summer of 1872 we had a good crop of fruit, although there were no bees to fertilize the bloom. I have also a record that shows that it was a good year for nuts, and that walnuts and hickorynuts were plentiful.

I now wish to draw your attention as a fruit-grower to the methods in vogue in securing the proper fertilization of strawberries. No fruit-grower would think of planting a variety of strawberry that was pistillate more than 16 feet from a staminate variety. If he did, he would not expect to secure much of a crop from them for want of proper fertilization. If, as has been so often asserted, the proper fertilization is secured by the honey-bees, then there would be no necessity of this close planting, as the bee usually, in its flight from flower to flower, covers much more than the distance mentioned. I must, however, say that, after close observation in my 20 years' experience as a fruit-grower, I never knew bees to work on strawberry bloom to any extent, and some years they scarcely visit the strawberries at all when in bloom; yet they were properly fertilized, and produced a good crop, showing conclusively that the fertilization of the strawberry takes place without the aid of honey-bees.

As boy and man I have kept bees for over 40 years, and during the first 30 years of my experience I frequently sowed buckwheat, so that my bees would have fall pasture; but I have to record the fact that more than half the time that I raised buckwheat my bees never gathered a pound of buckwheat honey, and yet it never made any difference whether the bees worked on the buckwheat bloom or not. I got a crop of buckwheat all the same. Nature did its own fertilizing. Four years ago one of my neighbors had five acres of buckwheat within half a mile of my apiary of 35 hives of bees, and I watched that buckwheat closely, in hopes of getting a good supply of fall honey; but my bees never visited it, and I got no buckwheat honey; but my neighbor did get a good crop of buckwheat.

Basswood is one of our best sources of honey, and basswood raises seed just the same as fruit-trees raise fruit, and it is just as necessary that the bloom of basswood and other forest-trees be fertilized to make them bear as it is that fruit-trees should be fertilized for the same purpose. Some seasons I have known basswood-trees to be laden with bloom, and the bees worked on it in swarms from daylight until dark, and the same years the trees would be full of seed, and other years the trees would be loaded with bloom, and not a bee would visit them, and yet the trees would be loaded with seed. The past summer was just such a season with us. Every day during basswood bloom I passed ten or twelve basswood-trees from four to six times in making my trips to market with berries; and although the trees were fairly covered with the large clusters of bloom, a careful watch never showed a single bee on any of the trees, and yet those trees were properly fertilized, as shown by the large crop of seed.

I have been living where I now live, for 22 years, and in my dooryard are several good-sized oak-trees. I have watched those trees when in bloom, and find that some years the bees work on the bloom, and other years they take no notice of it whatever, and it makes no difference whether the bees work on it or not. The trees raise acorns every year when they bloom. Wheat, oats, and other small grain, produce pollen just the same as fruit and forest trees, and fertilization is just as necessary to them as to fruits; yet the claim is never made that bees are necessary to the fertilization of these crops. The fact is, bees do so little work on them that they are lost sight of in a discussion of this question. It must be admitted, however, that, if nature can properly fertilize these crops without the aid of bees, it can fertilize fruit or any other crop without their aid.

Sometimes the statement is made, that certain kinds of fruit in certain specified localities have failed to produce fruit, and that the introduction of bees into that locality has caused an entire change, the bees being credited with fertilizing the bloom, and thus causing the trees to become fruitful. This claim, in the absence of more pronounced experiments, is not to be relied on. Many orchards have failed to bear fruit for a number of years, and then become fruitful, although bees were plentiful every year. In the spring of 1892 my orchard bloomed profusely, as did all other orchards in Muscatine Co. The spring was rather wet, but yet there were days when the bees worked briskly, and gathered both honey and pollen, and yet

we had no fruit. The cause of the failure to bear fruit was not for want of proper fertilization. The present year we had no apples, and other tree-fruits were scarce, and the cause of the failure was not for the want of proper fertilization, but from other causes. We are in hopes of a good crop of fruit next year; and if we get it we shall not give the bees the credit, as they failed to give us a crop the past two years; and should the same or a similar calamity that overtook the bees in 1871 overtake and wipe them out of existence, and should we get a good crop of fruit next summer, we will not blame the bees for our failure the past two years, for we know the causes have been entirely outside of any influence they have had.

There is much more that might be written on this subject; but enough has been given to show that there are two sides to this question, and that the only way to bring out all the facts and arguments bearing on the subject is to have an unbiased and unprejudiced discussion of the same.

I might add, that, after 20 years' study of the matter, I now believe that nature never intended that vegetable productions, in their love-embrace, should ever require the aid of a third party, any more than the human family or animals, and that nature has furnished every living species or kind the power to reproduce itself within itself. W. S. Fultz.

Muscatine, Ia.

[This is pretty well answered an article which we published in 1891, Sept. 15, from the pen of Prof. Cook. Our comment appears further on. It is not our custom to reprint old articles; but in this discussion many of our present readers may not be able to refer to the back number mentioned.]

The producers of flower-seeds in our cities keep bees in their greenhouses, as they find this the easiest and cheapest method to secure that more perfect fertilization upon which their profits depend. Secretary Farnsworth, of the Ohio Horticultural Society, could account for a very meager crop of fruit a few years since, in his vicinity, after a profusion of bloom, only through lack of pollenization. The bees had nearly all died off the previous winter. I have often noted the fact, that, if we have rain and cold all during the fruit-bloom, as we did in the spring of 1890, even trees that bloom fully are almost sure to bear as sparingly.

Darwin's researches considered insects as a whole, and it is true that all insects that visit flowers, either for nectar or pollen, do valuable service in this work of pollenization. Thus many of the hymenoptera, diptera, and coleoptera, and not a few lepidoptera, are our ever ready helpers as pollenizers. Yet early in the season, in our northern latitudes, most insects are scarce. The severe winters so thin their numbers that we find barely one, whereas we can find hundreds in late summer and early autumn. In late summer the bumble-bees and paper-making wasps number scores to each colony, while in spring only one fertile female will be found. This is less conspicuously true of solitary insects, like most of our native bees, and wasps; yet even these swarm in late summer, where they were solitary or scattering in the early spring. The honey-bees are a notable exception to this rule. They live over winter, so that even in early spring we may find ten or fifteen thousand in a single colony, in lieu of one solitary female, as seen in the nest of bombus or vespa. By actual count in time of fruit-bloom in May, I have found the bees twenty to one of all other insects upon the flowers; and on cool days, which are very common at this early season, I have known hundreds of bees on the fruit-blossoms, while I could not find a single other insect. Thus we see that the honey-bees are exceedingly important in the economy of vegetable growth and fruitage, especially of all such plants as blossom early in the season. We have all noticed how much more common our flowers are in autumn than in spring time. In spring we hunt for claytonia, the trillium, and the erythronium. In autumn we gather the asters and goldenrods by the armful, and they look up at us from every marsh, fence-corner, and common. In May *our* flowers demand a search, while in California the fields of January and February are one sea of blossoms. The mild California winters do not kill the insects. There a profusion of bloom will receive service from these so-called "marriage-priests," and a profusion of seed *will* greet the coming spring time. Thus our climate acts upon the insects, and the insects upon the flowers, and we understand why our peculiar flora was developed. Yet notwithstanding the admirable demonstrations of the great master Darwin, and the observations and practice of a few of our intelligent practical men, yet the great mass of our farmers are either ignorant or indifferent as to this matter, and so to the important practical considerations which wait upon it. This is very evident, as appears from the fact that many legislators the past winter, when called upon to protect the bees, urged that fruit-growers had interests as well as the bee-men, not seeming to know that one of the greatest of these interests rested with the very bees for which protection was asked.

Now that we understand the significance of the law of adaptation in reference to the progressive development of species, we easily understand why our introduced fruits that blossom early would find a lack of the "marriage-priests," and why it would be a matter of necessity to introduce the honey-bee, which, like the fruits, are not indigenous to our country, just as the bumble-bee must go with the red clover, if the latter is to succeed at once in far-off New Zealand.

It is true, that we have native apples, cherries, plums, etc. But these, like the early insects, were scattering, not massed in large orchards, and very likely the fruitage of these, before the introduction of the honey-bee, may have been scant and meager.

Now that spraying our fruit-trees with the arsenites, early in the spring, is known to be so profitable, and is coming and will continue to come more generally into use, and as such spraying is fatal to the bees if performed during the time of bloom, and not only fatal to the imago, but to the brood to which it is fed in the hive, it becomes a question of momentous importance that *all* should know that bees are valuable to the fruit-grower and the apiarist alike, and that the pomologist who poisons the bees is surely killing the goose that laid the golden egg. That bees are easily poisoned by applying

spray to trees that bear nectar-secreting blossoms, at the time of bloom, can be easily demonstrated by any one in a very short period of time. It has been demonstrated in a frightfully expensive manner in several apiaries in various parts of the country. Several bee keepers, whose all was invested in bees, have lost all this property, all because some fruit-growing neighbor either thoughtlessly or ignorantly sprayed his fruit-trees while in bloom; and this in the face of the fact that, for the best results, even in the direction sought, the spraying should be deferred until the blossoms fall. I have demonstrated this fact, where the results were entirely in sight. I have shut bees in a cage, and given them sweetened water, containing London purple in the proportion of one pound to 200 gallons of water, and in 24 hours the bees were all dead; while other bees, in precisely similar cages, and fed precisely the same food, with the poison omitted, lived for many days.

We thus see that it becomes very important that pomologist and bee-keeper alike know the danger, and also know the loss to both parties in case caution is not observed to avoid the danger and probable loss. It is also important that, by definite experimentation, we may learn just how important the bees are in the pollenization of plants. To determine this point, I tried many experiments last spring. I counted the blossoms on each of two branches, or plants, of apple, cherry, pear, strawberry, raspberry, and clover. One of these, in case of each fruit or each experiment, was surrounded by cheese-cloth just before the blossoms opened, and kept covered till the blossoms fell off. The apple, pear, and cherry, were covered May 4th, and uncovered May 25th and May 19th. The number of blossoms considered varied from 32, the smallest number, to 300, the largest. The trees were examined June 11th, to see what number of the fruit had set. The per cent of blossoms which developed on the covered trees was a little over 2, while almost 20 per cent of the *uncovered* blossoms had developed. Of the pears, not one of the covered developed, while 5 per cent of the uncovered developed fruit. Of the cherries, 3 per cent only of the covered developed, while 40 per cent of the uncovered blossoms set their fruit. The strawberries were covered May 18th, and uncovered June 16th. The number of blossoms in each experiment varied from 60 in the least to 212 in the greatest. In these cases, a box covered with cheese-cloth surrounded the plants. The plants were examined June 22d. Eleven per cent of the covered blossoms, and 17 per cent of the uncovered had developed. To show the details, in one case 60 blossoms were considered, 9 of which in the covered lot, and 27 in the uncovered, had developed. That is, three times as many flowers had set in the uncovered as in the covered. In another case of 212 blossoms, the fruit numbered 80 and 104. In a case of 123 blossoms, the number of fruit was 20 and 36.

These experiments agree with similar ones of former years, in seeming to show that strawberries are less affected than other fruit by the exclusion of insect visits. The raspberry canes were covered with cheese-cloth May 30, and uncovered July 6. In every case but one the canes seem to have been injured by the covers, and so the results were not considered. In the exceptional case, 184 blossoms were considered; 93 blossoms developed on the covered canes, and 160 on the uncovered. In every case the fruit on the covered twigs was inferior. It might be thought that the simple presence of the covers was prejudicial; though this could not be a very important matter, as blossoms covered after the bees had freely visited them set well, and showed no injury. Thus we see that, in all our fruits—strawberries the least—the free visits of insects during the period of blooming is absolutely essential to a full or even a fair crop. In many cases the covered blossoms all fail to develop. We also see that, where fruitage does occur, there seems a lack, as the fruit lacks vigor. The free and ample *cross-fertilization* seems to be requisite, not only for a crop, but for a perfect development and maximum vigor.

Our experiments with clovers were tried with both the white and alsike. While the uncovered heads were full of seeds, the covered ones were entirely seedless. This fully explains the common experience of farmers with these plants.

Having the law of the necessity of insects to accomplish this function so well demonstrated, it might be asked. "Why do we have *any* fruit in case the blossoms are covered?" This seeming exception may be no exception. Indeed, this may come from the fact that *all* insects are not excluded. Very many insects, like the thrips, and various of the jassidæ, which we know are often attracted to flowers, either by the pollen or nectar, would be concealed about the plants, and, from their small size, might gain access, even after the covers were adjusted. These would be sufficient to secure partial fertilization, and very likely are the cause of the meager crop which, in a few cases, we secure, even on the covered twigs.

In case of strawberries, our experiments this year, like some previously tried, seemed to show that the presence of insects, though important to a maximum production, are not so necessary as in case of nearly all other fruit. But we must remember that the strawberry-plants are not wholly inclosed. A cloth-covered box rests on the ground about the plant. This gives a fine chance for insects that burrow in the earth, and for insects that have pupated in like position to come up during the three or four weeks of the experiment, and pollenize the blossoms. This, though a possible, and (shall I say?) a probable explanation, may not be the real one. But we can still affirm, in case of the strawberry, that the free visits of insects serve surely to much enlarge the production of fruit.

Thus we see that our horticulturists and farmers alike, with the apiarist, are dependent for the best prosperity on the presence and well-being of the bees. They should realize this fact, and should demand that our legislators not only become informed, but act accordingly.

[In the *American Bee Journal* for Dec. 14 appears a letter from G. W. Brodbeck, of Los Angeles, Cal.. one of the leading bee-keepers of the State. We have room for only two paragraphs of his valuable article, and here they are:]

The California State Fruit-growers' Association has been in session here this week; and, being interested to some extent in fruit culture, as well as bee culture, together with Mr. McIntyre (who was a delegate), we heard much of interest to fruit-growers, and, at its close, something that caused us bee-keepers to prick up our ears and listen with close attention.

The subject was "Fertilization." A gentleman stated that he had a friend in this State who started into fruit-growing several years ago, locating 35 miles from any fruit-growing section, or where any bees were located. The first year that his trees blossomed, and in expectancy of at least some returns from his orchard, what should be the result but complete failure! He was advised to procure some bees to aid in the fertilization of the blossoms, and since then his orchard has been productive.

[Again, in the *American Bee Journal* for Jan. 4 appear also two paragraphs from the pen of C. J. Berry. He is Horticultural Commissioner for Tulare Co., an inland county that has of late made great progress in the fruit-industry. Mr. Berry, whose orchard contains 440 acres, writes:

Bees and fruit go together. I can't raise fruit without bees. Some of the other cranks say I'm a crank; but I notice there is a pretty good following after me, hereabouts, and they keep a-comin'.

Yes, sir, 'e. I have bees all about my big orchard. *Two years in succession I have put netting over some limbs of trees; and, while they blossomed all right, nary fruit; while on the same tree, where limbs were exposed to the aid of bees, plenty of fruit.*

Italics are ours. Such statements, coming from the fruit-men, are certainly strong evidence in favor of the bee. We may think that the statements from the bee-keepers would be biased; but when the *fruit-men* turn around and defend the bee, as they surely have done, will do, and are doing, the old-time opposition will gradually break down.

This symposium would be incomplete did we fail to make mention of the fact that, some three or four years ago, in the State of Michigan a convention of fruit and bee men assembled together for the purpose of discussing their *common* interests. The fruit-men acknowledged generally that the keeping of bees in the vicinity of their orchards was an important factor in the production of fruit. At various conventions of the Michigan State Bee-keepers' Association there has been furnished abundance of evidence, from bee-keepers and fruit-growers, that points in the same direction. Indeed, fruit-growers often become bee-keepers —not from the honey the bees may furnish them, but because they have found it necessary to keep bees in order to secure the perfection of fruit.

You will see that we are disposed to be fair in the matter, because we have given "both sides." But we are not at all afraid but that, when all the evidence is weighed, the balance of testimony on the bee side will completely overbalance the testimony on the other side.

The statement in the *Rural* (see Dr. Miller's article), that fruit has grown where no bees were known, proves nothing. Potatoes, wheat, and all other crops, will grow on poor land; but it would be foolish to say that there would not be *larger* crops on good land, or under other conditions more favorable. It is equally foolish to assert that, because fruit has been grown remote from bees, the importation of bees into that vicinity would have no effect. Again, the point is made by friend Fultz, that nuts and some other kinds of fruits, etc., were known to grow without the fertilization of any bees. Bee-keepers do not claim—indeed, it would be foolish to do so—that *all* products whatsoever depend for their fertilization upon the agency of the bees. All we claim is, that a large number of fruits are *assisted*, both in the quality and quantity of fruit.

Although we have given considerable space to this question in this issue, we still hold our columns open for further discussion either way; and when the whole has been secured we propose to put it in pamphlet form, and place it in the hands of bee-keepers for general distribution, at the mere cost of printing. This sort of "knock-down evidence," placed in the hands of fruit-growers that are at all intelligent and disposed to be fair, will remove opposition at once, and show clearly that their old-time opposition, if it existed, was simply trying to "kill the goose that laid the golden egg."—Ed.]

RAMBLE 100.

IN THE BRUSH.

How mistaken our good people of the East are when they picture in their mind's eye the appearance of the uncultivated country in Southern California! "Why," said an Eastern friend in a letter to me, "I should think that you would be afraid to live all alone away off in the woods."

"Yes," said I to myself; "woods!" Then I went out of my cabin, and could see not a woods at any point of the compass — nothing but brush, and but little appearance of green at that. In the distance, and around some ranch, or in some embryo town, a few tall gum-trees might greet the vision, while a climb up the rocky side of the mountain would perhaps reveal the deep green and woodsy appearance of the distant orange-groves. So it is, that the first settlers here use the *machete* (*mah-chay-tay*) for cutting and grubbing brush, instead of using the ax, which was made for the sturdy trees. The Mexicans are expert in the use of the former, and their loads of wood, or, rather, loads of the roots of chemise-bushes, are found for sale upon the streets of all of our towns.

Although there is but brush, it seems that nature has been at work here for several years preparing the surface of the country for habitation, and nature comes in for an immense amount of credit for so admirably fixing the surface for irrigation. The mountains, acting as great reservoirs for the water-supply, and the broad valleys between, level in appearance as a floor, but with incline enough to allow the water to flow in the irrigating-pipes to the appoint-

ed place. The valley in front of the Rambler's cabin is more than ten miles wide, and stretches away to the west until its level floor is lost in the haze of the distance. A great share of this area is still in the brush, the home of the owl, the coyote, and the jack-rabbit. Generally the air is so clear that the distant mountains stand out plainly, and seem very near; but a drive to them is long drawn out and tedious.

In the brush we find the settler taking up land here and there, and in many cases the house at first is of the most primitive character, made of brush by which he is surrounded, or it is a tent; or if a board house, its dimensions are of the most contracted and economical plan. I have noted one splendid feature about these one and two room houses; and that is, the amount of house-cleaning that is avoided by the good housewife, if perchance there is a wife —only an 8 x 12 floor to sweep and mop; only two (or at most three) windows to wash; one bed to make. Why! these pioneer women have an easy time of it when it comes to the care of a house. No surprise-parties. You may know that it is an indication of an advance toward a higher civilization when you hear of such parties in this country, for it means the building of more commodious houses.

In the brush we find many queer characters and methods of living. Here is a little house with barely two rooms. The dog barks as we approach; the cat whisks around the corner; there are also a few blooded hens sitting at ease around the door. In the course of conversation with the man of the house, the poultry business came up for consideration.

"Yes," says he, "Mariar" (his wife) "was bound to have some poultry, though they are as much bother as we get out'n 'em. You see," said he, "we have no poultry-house, and the coyotes have a special liking to good fat poultry; and just now Mariar roosts her poultry in the parlor."

"Why!" said I, "your chicks will get too high-toned with such treatment. Besides, I should think that the floor would show the wear and tear of the poultry business."

"Ha! ha! there's where you are mistaken. Mariar just knows this poultry-business to a dot. She sets an empty barrel in the parlor, the upper head is taken out and she roosts the poultry on the barrel with their heads pintin' out—see, stranger? If the rooster gets oneasy during the night thinking about his family, and indulges in an unseasonable crow, Mariar is sure to give me an unseasonable dig in the ribs, and say, 'Isaac, will *you* get up and see if that rooster is turned the wrong way on the barrel?' A good many times, especially just before a norther, which seems to make every thing oneasy, I have to turn the poultry heads pintin' out on the barrel; it's a tarnal bother; but Mariar has got this poultry-business down fine, and Mariar is a good woman, and a tidy housekeeper; but I'm bound to have a coyote-proof poultry-house in a few days."

At another place in the brush I found another tucked-up little cabin, occupied by a lone and grave-looking bachelor. I had lost my way; in fact, that day I was sort o' exploring the country, and had driven right across lots to this man's apology for a house. I was looking for the residence and person of Mr. J. Sealer, and made the proper inquiries. The sedate bachelor pointed out the location of the residence, across acres of brush, and a schoolhouse loomed up in that direction.

"What town is that?" said I, "where we see that schoolhouse?"

"W-a-l-l," said he with a drawl, "that-is-called-by-some-Sucker-t-e-o-w-n; yes," said he, "Mr. Sealer lives right around there somewhere. He-is-one-on-'em."

I left my lonely rancher with his dog and his newspaper, and proceeded until I felt as though I was getting off the trail again, and I pulled up to a more pretentious residence, and again inquired for John Sealer. This time I found that I had struck a full-fledged Dutchman.

"You vants to know vare liffs Chon Zealer? Dos you zee ze leedle end of dot housen mit the drees? Vell, dot Chon Zealer liffes there in dot nex housen."

"Let's see," said I; "I suppose this is Suckertown."

"Vat you calls it, Zuckertown? No, mine cracious; whoever says dhis is Zuckertown is one kosh-fired liar—*Vest Rialto* all ze time—ze pest colony in California."

Without further trouble I found Mr. Sealer's residence, and found him also to be a Dutchman, but of the Pennsylvania order, and he is a way-back bee-keeper—back east as well as in California. I had met Mr. S. just once before, and that was at the famous rabbit-hunt where we shot the jumping pests, and drank lemonade together from the same tin cup. Mr. Sealer and his brother have started in here under very favorable circumstances—have each a fruit

ranch of ten acres, all in growing fruits, and have a fine apiary of some less than 100 colonies, all in the brush near by.

Mr. S. and his whole family scouted the idea that this town was called Suckertown, and imputed evil motives to the man in the cabin. Mr. Sealer's bees are of the dark order of Italians; and as he had very good success in the East with a strain of Italians bred by a Mr. Metcalf, he had ordered queens from him since he came to California. This same strain of bees in the East was quite gentle, and it was a

pleasure to work with them; but out here they were very cross, and that is the general experience with bee-keepers who have managed bees both in the East and in this far West. In the East you can handle bees with impunity while they are gathering honey; and the more bountiful the honey-flow, the more wondrous kind they get; but here, the greater the bonanza they are working, the more angry they are, and they will go half a mile to find something to sting. During the extracting season, that length of old rusty stovepipe that sticks out from the Rambler's cabin roof is a persecuted object. They rattle against it about as you would rattle a typewriter. I have thought sometimes that it was their telegrams for some of my excellent pancakes—but I digress.

Mr. Sealer wanted me to see some more of the country to the north of his location, and we accordingly journeyed onward toward the Cajon (Cahoan) Pass. Mr. Bonart, another full-blooded German bee-keeper, we found about five miles along on our journey. His apiary was also in the brush, and evidently had no care except to take the honey from the hives at the proper time. There were either 350 or 400 colonies in the apiary; the owner did not know to within 50 or 75 colonies of how many he did have. Mr. Sealer assured me that Mr. B. was a warm-blooded Dutchman, and very cheerful; but to-day he was in a sad state of mind over the fact that his wife was dangerously ill with the pneumonia. His main idea seemed to be that, if she should die, every thing would be so lonesome whenever he would go into the house where he always found her. I sympathized with him for a short time in English, and then Mr. Sealer sympathized with him in Pennsylvania Dutch, and I was afterward greatly pleased to learn that his true and tried wife was on the road to recovery. The main thing to be noticed around Mr. B.'s ranch is the fact that bees and grapes seem to harmonize. Aside from the bees, the ranch is devoted to fruit, and there are many acres of wine grapes. Mr. B., having emigrated from the land of beer and wine, his principles are strongly bent wineward, and his grapes are carted by the ton to the nearest winery. Mr. B. says that the bees work at the grapes, but the greatest damage is done if the grapes are left on the vines too long; otherwise there is little damage done. He finds many other enemies to grapes; but the bees, going with a vim, for the remnants, get all the blame. Mr. B.'s neighbors, who are more or less in the fruit and grape business, were going to drive his bees out; but Mr. B., hearing of the Bee-keepers' Union, became a member, and vociferously declared his intention to hold fast to his bees, and he does unto the present day. Being about the first man to reclaim that portion of the wilderness of brush, he claims to have a prior right to stay there with all of his apicultural possessions as long as he pleases.

His honey-pasturage is acres of sage and many other honey-producing plants. The peculiarity of the growth of honey-plants here seems to be certain plants in certain localities. Here we would drive through hundreds of acres of wild alfalfa; a few miles further along, wild buckwheat would have full possession; then there would be acres, or, more like, square miles, of sage-bushes. Mr. B.'s workers, in order to get to these various fields, had merely to change their course of flight, or to fly a little further in certain directions. Mr. B.'s ranch showed much hard work, and also bore the evidence of genuine German thrift. The only thing that seemed uncared for was the apiary. I suppose the reason might be, that, while a grapevine or a tree will not bear fruit unless it receives irrigation and thorough tillage, the bee-hive will produce honey, even if surrounded with brush, and be left from year to year in an unkempt condition.

It would probably be useless to argue with such men, that better results could be secured if the apiary were kept clean. A clean apiary, however, whether giving better results or not in pounds of honey, is a better place in which to work; and a handsome apiary is always a pleasure to the eyes of the

RAMBLER.

CALIFORNIA ECHOES.

BY RAMBLER.

We seldom see a bee-tent in a California apiary. The reason in many cases is, that what work can not be done during the busy season is not done at all, therefore there is no use for a tent. Mr. Arthur Hansen, of National City, however, has a tent of great utility. When not in use as a bee-tent, an extra covering of heavy cloth is pulled over it, and it makes a tent to live in. Other California bee-keepers can take the hint, and have just as convenient a tent as Mr. Hansen.

What is the matter with those New York bee-keepers? One who raises his honey by the dozen tons writes to us about coming to California. Well, we suppose there is room enough for him here; but we advise him to stay where he is. If his lungs or his heart is out of kilter, the advice would be different. This climate heals the sick. It also heals the lacerating wounds of those who have met with heavy winter losses. Perhaps that is why the New-Yorkers wish to come here.

Speaking of heart trouble reminds me of a letter I received from a young man who said that his best girl had gone back on him, and he wants to know if there is any solace for a broken heart in the wilds of California. Why, my dear young friend, of course. When you have lived a year in a bee-rancher's cabin, and listened nightly to the musical notes of the festive coyote, you will forget that you have a heart at all at all. By all means, come to California.

And now we see that the *A. B. J.* suggests Bro. Larrabee's name for that Vermont experiment station. It is our opinion, that, if Bro. Larrabee, after swinging himself around in the great State of Michigan, goes back to Vermont, we shall expect to hear that he has stepped off into Lake Champlain, or stumbled over into New Hampshire. Why! we don't believe Vermont is big enough to hold him. Say, Bro. Larrabee, make a break and come to California; there's room enough for you and three of the New England States right here in this one San Bernardino Co. If your brother Walter is bound to stay by the old hopvine and apple-tree, put the experiment station with him. But, Johnnie dear, we want you in the glorious sunset country.

"You press the button and we will do the rest," is about the way the Rambler and the artists have it in those cartoons in GLEANINGS; but sometimes the artists do too much. Now, on page 927 they have cut the fields up with rail fences. Why, bless you, Mr. Artist, we have not seen a rail fence since we came to California. We are not grieved over it, however; but every Californian will stare at those rails, and miss seeing that nice doxology hat of the

RAMBLER.

JAKE SMITH'S LETTERS.

HINTS ON SPELLING.

A. I. Gleenings:

deer sir—Did you hef to learn to spell when you was little, or when you was a man? Or mebbee you have so many to work for you that you hire a hand to spell for you. Well, I don't think much of the fashionable way of spellin, and I think my way is a good deal better. When I want to spell a word I believe in spellin it what it is, and not puttin in a whole lot of letters that make it spell something altogether different. If I write the word *reseat*, I believe in spellin it that way so any body can tell what it is, and not write it any such fool way as *receipt*. And if I write about Kernel Smith, I believe in spellin it *Kernel* or *Kurnel* or *Curnel*, or some such way so as to have it make the word Kernel. But the fashion makes it spell *Colonel*. What an nfolonel way of spellin that is, anyway!

But my famaly—leastways the young folks—got it into their heads that my spellin was not up to the latest style, so Zed he's been teachin me to spell. He made a blackboard, and then he put on it words spelt the right way, and then under each word he put the fashionable way of spellin it, like this:

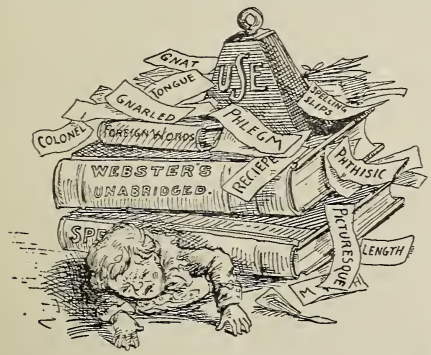
tung	throo	wir	fokes	tizick
tongue	through	were	folks	phthisic

Then he told me to sit down and practice writin them till it was easier that way than the old way. I tell you it was harder work than I ever dreamed of. Why, I'd a heap rather go out and thrash with an old-fashioned flail all day than to try to learn sich outlandish things. But I kep at it, and I thought I was gettin on pirty well. Then I thought I might as well be learnin some more words to spell in the fashion, and it would please Zed to think how I was gittin along. So I wrote, "In the yard were a cere and a cat with white fere which did pere till she got a bere in here fere." But afterward Zed said it ought to be, "In the yard were a cur and a cat with white fur which did purr till she got a burr in her fur."

Another verse I wrote was, "Through all the night, tough lovers trough did silently wough." But Zed said that ought to be, "Through all the night, two lovers true did silently woo."

But the verse I laid myself out on most, trying to git it up in real high style, was this: "The man with the phthisic phthook phthwo phtheaspoonfuls of phthansy phthea." And, if you'll believe it, Zed said that must be, "The man with the phthisic took two teaspoonfuls of tansy tea." Do you wonder I felt a little discurridged?

Now, Mr. Gleenings. I've been thinkin this matter over, and it seems to me something ought to be done about it. Zed was readin that it took from 2 to 4 years more of the life of a child to git his schoolin now than it would if this nonsensickle way of spellin was abolished, and every letter had just one sound and every sound one letter. Why, the way it is now, when a boy writes a word he knows he's writin it what it don't spell, and how much different is that from tellin a lie? Is it any wonder that people that spell that way git to lie and steal?



Now jist you tell me, if it was grown-up folks that had to learn to spell, and they knew that spellin the fool way it is now would take 3 or 4 years longer to learn, or even if it was only 1 year, jist tell me how long that thing would be stould. Why, there would be rebellion about it in no time, and partitions would be sent to congress, and the president's message would be full of it, and laws would be passed to change it right off. But because it's little children that can't help theirselves, the thing goes on from year to year. I tell you, it's an outrage, and the society for the prevention of cruelty to children better quit foolin about children bein took out of school to ern a livin, and save them the years they waste on this wrong way of doin things.

If all the money that's spent every year for teachers to teach the extra years was put along with the money that could be saved on paper and printin and ink for sighlent letters that only make trubble in spellin, if all that money could be saved it would send bibles to all the heathen.

Now will you please think it over, and print what you think about the shamefool oppression of innocent little children? JAKE SMITH.

APICULTURE IN RUSSIA.

BEARS AND BEES; BEES IN TREES.

The wild bees of Russia are somewhat more fuzzy, blacker, and thicker, than the domesticated ones. They build their combs in hollow trees, where they are sought for by the bear and the honey-cuckoo—the latter serving at least as a guide to man. Without being in the least cared for, the bees yield their tribute of honey and wax, although not willingly. As the bear, after satisfying its appetite, takes no further thought for the continued work of the bees, just so careless are men, very often, in working with wild bees.

Bee culture in its primitive state is prosecuted with great vigor in Russia, and especially by the Bashkirs. The greater part of the bee-gums there are in the woods, where these insects gladly avail themselves of the accommodations provided for them. With this object in view, the Bashkirs choose the strongest and straightest trees, of the hardest kind of building timber, in which, at a height of from 18 to 24 ft. above the ground, they construct the bee-houses by hollowing out the trunks of these trees smooth and even, with a tool resembling a chisel; and then the men close the entrance with a board, in which are bored small holes for the bees to crawl in and out. The dexterity with which the Bashkirs do this work, and climb the tallest and smoothest trees, is very surprising. Below the bee-houses the limbs are all carefully cut off, so as to render it more difficult for the bears to climb up the trees to get honey. But in spite of all this, these animals, which are still plentiful enough in the Ural Mountains and forests, prove to be the most dangerous foe to the bee-keeping industry.

But double-walled hives are now known in Russia, made of thick plank. The whole hive-body is so solid as to be practically bear-proof. At all events, bees in such hives enjoy the greatest immunity from cold. The frames of these hives have a height of about 26 inches, with a breadth of about 10 inches. The inside width of the hive-body measures about 11½ inches. This space of 1½ inches (between the ends of the frames and the sides of the hive), or ¾ inch on each side, is just about filled by the thickness of the wood composing the end-bars of the frames. The space above the frames is divided by three movable partitions into four divisions. The hives have a double bottom, with a space between of about 1½ inches, which is stuffed in winter. KARL R. MATHEY.

Medina, O., Jan. 1, 1894.

"RAISING" BEES.

A CHEAP DEVICE TO MAKE BEES LET PASSERS-BY ON THE HIGHWAY ALONE.

BY WILDER GRAHAME.

More than once my neighbors had been annoyed by my bees attacking them as they were passing along the road a short distance off, and more than twice I had been appealed to to abate the nuisance. The matter was becoming serious, especially as I could see no better location for my hives. Whichever way I turned them, a road or neighbor's yard was right in

range; and, besides, after the bees left the hive they would go in whichever direction they preferred, any way. I found, however, that where they issued from the opposite side of the hive from their pasture-field, they usually rose somewhat higher before they reached the road. Still, this was only a partial remedy, and I determined to observe further. I was not long in discovering that few if any of my bees went to their highway attacks "with malice aforethought." Instead, they were making the traditional (though not the traditionally straight) bee-line for their forage-ground, when, just as they would attempt to cross the road, along would come some useless thing bigger than themselves, and block the passage. I have noticed that it doesn't matter particularly whether a person runs against a club or the club falls against the person, if the velocity is the same. That is probably the way a bee looks at it, and bees don't like to be insulted. They sit down hard on that at once, and sting. I don't blame them. I have wanted to do the same when I have miscounted the stairs to the first landing in the dark. I have even sat down hard on such occasions, though I went no further than that, till a light came or I had recounted the stairs. But really it isn't a funny matter to the bees, and the neighbors won't admit the joke. So far I had solved the why of the problem. It now remained to seek the wherefore.

There are two safe ways for railroads to meet road-crossings—to wait or be waited for at the crossing, or to switch off on some other line and not cross at all. I saw no way to make the bees wait, so I decided to switch them off. As a first step I built a trellis just inside the garden fence, and covered it as soon as possible with some rapid-growing vines. The trellis was perhaps eight feet high, and consisted of a few posts to which common fence-boards were nailed. This part of the work was done as early in the spring as possible, and the seeds sown as soon as the condition of the soil and climate warranted. Just back of this I commenced work on a more permanent sort of trellis, and set out a row of grapevines. It was late for them, but most of them are thriving, though I don't expect them to take a very active part in my plan for some years. But the vines along the outer trellis grew rapidly, and soon covered the framework with a mass of foliage and bloom.

This contrivance, I have no doubt, interfered with the bees to some extent at first, and possibly submitted to a few severe stings; but it made no complaint, as the neighbors had, and gradually these animated bullets learned to rise somewhat before they shot, and clear the trellis. It was about the most peculiar method I ever heard of for raising bees, but the results were most gratifying. After they are once up in the air they seldom drop much till they approach their stopping-place—certainly not in the short interval between the trellis and the road.

"It is a pleasure to drive past your bee-hives now," said one old fellow last summer. "It is interesting to look up and see that steady stream of bees going zip, zip, and no danger from them. I used to think they went out of their way to sting, but they don't now."

Perhaps they did then; but as they have been turned from that course I feel that I have solved a problem that formerly gave me no little vexation. That is what those vines do. Now about the grapevines starting inside. The quick-growing vines I mentioned are a sort of makeshift that have to be renewed each year. The grapevines, after they obtain their growth, will make a permanent bee-break, and protect my plague-stricken neighbors from further injury.

[We formerly used a high board fence to raise the flight of bees, but we now use instead, with much more satisfaction, a row (or, rather, a hollow square) of evergreens, 18 to 20 feet high, and branches closely intertwining. The board fence was good, but the trees are far better. What is perhaps cheaper and better for most bee-keepers is the rapid-growing vine referred to by our correspondent. The most rapid-growing vines that we know of—those whose foliage is very close—is wild cucumber and woodbine. These two are good, as we happen to know from actual tests. Probably they can be obtained of your nearest nurseryman. The first one is the most rapid growing.—ED.]

BOOK REVIEW.

THE LAST.

Of the remaining bee-books now in our possession, the following may be mentioned as having done much to instruct men in regard to apicultural matters:

A book written by "The Times Bee-master" is the first one that has received attention. It consists of a series of letters written, presumably, to the London *Times*, and here put in book form. The writer (unknown) was "up to the *Times*" in at least one sense, and perhaps in all senses. The letters are of a very miscellaneous character, and are a beautiful combination of practical good sense and a true literary spirit. This book was printed in 1864, in London.

"The Bee keeper's Manual" was written by T. B. Miner, and printed in New York in 1850. It forms a sort of connecting link between the old and new era in bee-keeping. The author says we know nothing about the sex of worker-bees. His work abounds in many dogmatic statements and consequent errors, which some careful hand has corrected on the margin. The author is very severe on Huber, and condemns him for asserting things which we now know to be true—notably, the visible marks of fecunda-

tion of the queen. Mr. Miner wrote about forty years too soon, and yet there are many interesting pages in his book. Do any of the readers of this remember the Miner hive?

Bromwich's "Treatise on Bees" was printed in London in 1783. It is a little book of only 66 pages, but as meaty as an egg. The author was remarkably correct in regard to the different kinds of bees in a colony, and his method of management was certainly as good as his time furnished. Much of the book is taken up with recipes for making mead and wine of honey. The author gives some figures showing that bees can be kept more cheaply in colonies—that is, several stocks in large boxes near together—rather than in separate hives some distance apart. His line of reasoning here would end in the use of what is now called a house-apiary.

"Bagster's Management of Bees" is a book that enjoys the unique reputation of having the most beautiful and correct pictures of the drone, queen, and worker, both natural size and greatly enlarged, of any bee-book we have yet seen. Of course, reference is here made simply to the external appearance of the bee. The coloring was evidently done by hand, in water-colors, and it is truly superb. Just here I notice that some one has written at the foot of the page, "The best illustrations to be found." Correct. This book has no date, but it was printed not long after 1844, in London. It has but little originality about it, being modeled largely after Huish and Huber. It is far better illustrated than most English bee-books of that day, both in quality and quantity. The frontispiece represents three ladies standing in front of a hive that reminds one for all the world of Jake Smith's "pallus" hive. It has a double (or ∧) roof, and a door in the gable end, the whole resting on a pedestal about two feet high. One of the ladies must be "Misses Barber," while the other one is "Misses Porter," and the one opening the hive so blandly is "Misses J. Smith." The sequel to this hive-opening will be found on page 218 of last year's volume, where Mr. Smith tells us all about it. "Truly, they wuz a sight." This little book of Mr. Bagster's is well calculated to give a casual reader a little touch of the bee-fever, as it presents apiculture in glowing colors—especially the pictures of the bees.

It would be very interesting to know the origin of the remaining bee-books and apicultural tracts not yet noticed. It seems strange that, in a pursuit like that of bee-keeping, when new discoveries crowd so fast upon each other, thus rendering the bee-books of to-day almost useless to-morrow, so much time and money should have been spent in times past in bringing such books to the light. The constant changes made on the A B C of Bee Culture here, impress strongly on my mind the fact that a work on bees has to be changed as frequently as an almanac, in many respects; and why these worthy old English bee-keepers should have imagined that any of their works would be read for any length of time, except as curiosities, is past comprehension. Cook, Cowan, or Cheshire contains more of value and truth than all of these old bee-books put together; yet the man who has read even a part of them is a better man in more ways than one for having done so. The apiculture of to-day is the evolution of all who have labored before us in that direction; and let none of us laugh at the ladder by means of which we have scaled the wall of present knowledge. Much remains to be known; but yet we believe the great fundamental truths of the anatomy and habits of bees, as now stated, will be accepted by future generations, just as they will surely accept our belief that the earth is round, and that it, in common with other planets, moves around the sun, and not the sun around us.

Exeunt Butler, Purchas, Rusden, *et al.*

Medina, O., Jan. 10. W. P. ROOT.

EXACT SPACING NOT NECESSARY.

COREY, OF SMOKER FAME, GIVES HIS VIEWS.

Bro. Root:—Our esteemed brother Dr. C. C. Miller proposes starting from bedrock, and having things shipshape in his proposed "New-departure apiary." His head is level on one proposition at least—that is, the size of the frame 17⅝ x 9⅛, as it has been so generally adopted.

Upon the question of the exact spacing of hanging frames he is away off. The tinner who can not make a set of rabbets for a hive, as straight as an engineer's rule, and a carpenter or mill man who can not saw a set of frames (especially with 1⅛ top-bars) that, when nailed, will hang almost perfectly at the bottom without even ⅛ inch variation, can not hold down a job out here in the wild and woolly West. Then with the top of the hive stenciled so as to have a black mark the width of his space, any frame can be set into the hive without afterward changing its place until the whole set is placed in position.

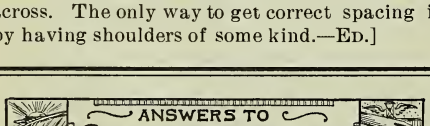
With the correct views Dr. M. has on most points in bee-keeping, how he has managed to get along with frames, some touching each other at the bottom while others are an inch apart, is beyond my comprehension; but it must be he did, as he made the plain confession on page 883, GLEANINGS for Dec. 1.

With the clamps we use to hold our frame material while being nailed, and with 8 nails in each frame, they pile up as true as dressed lumber, and are a correct mechanical job in every sense. I have kept bees 33 years, since movable frames came into use, and have seen all the frames, both hanging and closed end, half closed-end, closed and partially closed tops, and have no use for any thing but a hanging frame. If I wish to have them tight for moving, I use

spacing-sticks that slide down between the end-bars of frames, which hold them as firmly as tight-fitting or fixed-distance frames. I prefer to have my frames always loose, and resting on hemmed tin rabbets, for about 363 days in the year. In case I want them all tight for moving the other one or two days, I put them in that condition in a short time. Finally, Dr. M., you had better make your frames to suit yourself; but above all things, have them made better than your frames have been made heretofore. When he gets every thing in shape, and has used this new-departure hive, I hope he will tell us all what it is like and how it works.

Santa Paula, Cal., Dec. 7. JNO. G. COREY.

[There is one point that you seem to have overlooked on the rabbet question No matter how accurately they are cut, if of wood, or how accurately made if of metal, little lumps of propolis will collect on the under side of the bearing surface of the top-bars, so that the frames will hang more or less out of true; and, again, there is not one man in a hundred who will nail the ordinary swinging frame (no matter how accurately cut) so that, when the same is laid on a smooth and true surface, like a marble slab, it (the frame) will touch the slab at all points. But suppose he does put them up as true as a die; subsequent wiring, or moisture of the colony, will be apt to throw them out a little. We have looked into the hives of many apiarists, and find that the bottom-bars of swinging frames vary in spacing, as Dr. Miller says. We will venture to say, that we can find the bottom-bars of your frames in like condition. If we can't, it will be the first apiary of loose swinging frames of the kind we ever came across. The only way to get correct spacing is by having shoulders of some kind.—ED.]



Question.—As I am about preparing for the coming season, I should like to ask if it is practicable to produce comb honey in marketable shape without the use of separators. If such is the case, it will cost me less in getting up my surplus arrangements.

Answer.—This matter of separators or no separators was a "bone of contention" from six to ten years ago; but of late we hear little about it. At that time many of our prominent bee-keepers, such as Heddon, Hutchinson, Demaree, Tinker, and others, thought that, with proper width of sections, and with black or hybrid bees, where a good honey-flow was the rule, separators might be dispensed with, and the crop of honey be "ilt edged" for market. Others, who were more reserved in their opinions, like Dr. Miller, thought it best to go slow, as they were not making a success in trying to get along without separators. Still others, like myself, who generally glassed their honey (as the eastern markets called for a certain amount of glassed honey), claimed that it was impossible to do away with separators and yet have the faces of the comb even enough so they could be glassed, without damaging them to a greater or less extent. I have several times tried to do away with separators, but each trial has resulted in loss, so with me I can say it *is not* practical to try to produce honey without separators, even did the cost of separators become double and treble what they now are. If any person is now raising comb honey largely for market, and not using separators, I am not aware of the fact, and would advise no one, especially a beginner, to try to raise comb honey without their use.

Question.—How about reversible frames? Do you use them, and is there enough gained by their use to pay for their extra cost and the extra manipulation required?

Answer.—Here again we have one of the disputed questions of the past. Reversible frames had a more extended "airing" than did the no-separator matter, multitudes of plans for good reversible frames and their manipulation being placed before the readers of the bee-papers some eight or ten years ago; but, if my memory serves me rightly, I saw the names of many of our most prominent apiarists, in the query department of one of our bee-papers, on the negative side of this matter not long ago; and if any are now making a business of using and manipulating reversible frames I am not aware of the fact. The main object for which they were brought into existence was that of compelling the bees to store all their honey in the sections by reversing the frames as often as the bees lengthened out the cells along the top-bars of the frames and filled them with honey, thus placing this honey in an unnatural position, and causing the bees to remove it; and as there was now brood in the upper part of the frames, this removed honey could not be stored there, hence must be stored in the sections. This theory looks fine; but when I came to put it in practice I found the bees did not think it just the thing, and colonies so worked accumulated no more in the sections than did others let alone, while at the end of the season the colonies left alone showed a decided advantage, inasmuch as they had honey enough to winter on, with little or no honey in those whose frames had been reversed several times. The c aim was also made, that the reversing of frames would do away with swarming, as the queens occupying the reversed queen-cells would all die. Many queens in the embryo form would thus die; but as swarms were sure to issue from

queens not killed by reversing, or by the swarms coming out without any capped queen-cells or any preparation along the line of queen-cells, the reversing of frames for this purpose proved as fallacious here as for section honey. The only advantage I could ever find in reversing frames was that, by thus doing, the combs would be built as perfectly to the bottom-bar of the frames as to the top-bar, so that the trouble of ridding the frames of bees, on account of their hiding in the space between the bottom-bar and the comb, was obviated. While this was a real gain, yet in my opinion the gain here is not of sufficient amount to pay for the trouble and cost of reversible frames. This can also be accomplished in other ways, such as placing the frames in an upper story and running for extracted honey, or having them filled with early honey for the bees to winter on.

Question.—What is the best way to purify beeswax so as to free it from dirt and give it that nice yellow look we see in some of the foundation sent out? I have a lot of old dirty beeswax and old combs which I wish to reduce to nice yellow wax this winter.

Answer.—If I mistake not, some of our foundation-makers bleach or cleanse their wax by the use of chemicals. Regarding the use of these I know nothing, and I doubt whether the ordinary practical bee-keeper could make it pay to use chemicals for purifying beeswax, even were he familiar with their use. Any plan by which the wax is kept in a liquid state for a long time, the same being perfectly stationary during this time and while cooling, and using quite a body of water with the wax for the dirt to settle into, has a tendency to separate the impurities from the wax, and give it a bright yellow color. If, in addition to the above, a pint of good strong vinegar is used for every ten pounds of wax and one quart of water, the result will be far more satisfactory. My plan is as follows: Put 10 lbs. of wax, one quart of water, and one pint of strong vinegar, into a flaring tin dish, and set it on the stove till the wax is melted and the whole become as hot as it will bear without boiling over. If the impurities are of any size it should now be strained through common cotton cloth, or these impurities are likely to be partially imbedded in the wax at the bottom of the cake when cold, so as to make the job unsatisfactory. Having this accomplished, spread down two or three thicknesses of old carpet or two or three horse-blankets, where the wax is expected to stay till cold; then set the vessel of wax in the middle, and wrap over the top and sides till well protected from the outside air, so that the whole may be two or three hours in cooling. If you will watch the liquid you have in the vessel before covering up, you will note that the whole mass seems to be in agitation, rolling and turning about as though it were alive. This is the work of the vinegar, and that which makes the dirt separate more perfectly from the wax than it otherwise would. If strained as given above, there will be only a fine dross at the bottom of the cake when cold, which is easily separated from the wax by scraping with a dull knife. Bro. A. I. Root said in GLEANINGS, some fifteen years ago, after receiving wax of me treated in the above way, that the same was the nicest wax he had ever received up to that time. The above way of cleansing wax did not originate with me, but was given by Quinby in his "Bee-keeping," about 30 years ago.

Heads of Grain, From Different Fields

THOSE STRAWS.

Dr. Miller must have raised a good crop of straw this year—long and short straws, little and big straws, and pointed straws. I am very busy getting ready for Crystal Spring Farm Apiary, where I will welcome all bee-keeping friends at any time after the first of March.

Carpenter, Madison Co., Ill. EDW. SMITH.

BEE-CANDY—A CAUTION.

On page 881 of GLEANINGS for Dec. 1 I notice a valuable article on candy for queen-cages and feeding bees, by Mrs. Jennie Atchley; and as I read it over I was wondering how many of the bee-keeping friends have had trouble in making a candy that was just right; and did it ever occur to them that the sugar might be at fault? I do not remember of ever seeing mention made of it in the journals or text-books, but there is to be found on the market what is known to the trade as powdered XXXX sugar, which is much used for frostings, etc., for cake, and is used without eggs or cooking; and it will set or harden in a very short time, something like plaster of Paris. It is wholly unfit for use in making bee-candy, and I thought perhaps it might not be out of place to mention it at this time, as it is usually sold in place of the common pulverized sugar, which it strongly resembles in looks, but it is not so sweet; and unless the purchaser is posted, and states that it will not answer, usually no mention is made of it by the party selling it. I should probably have been ignorant of its existence myself had I not been engaged in the grocery trade for a number of years, during which time I came across it, and have tried it in my family, etc., but I can not recommend its use as a food or for general purposes. T. J. DUGDALE.

West Galway, N. Y., Dec. 5.

[The candy that we have been using with such success is the very one which you seem to think is not suitable. What we have ordered is XXXX powdered sugar. It has a very dif-

ferent character from the ordinary powdered sugar, and seems to be somewhat lumpish in the barrel, and suggestive of starch. We should like to hear from Mrs. Atchley with regard to the kind she has been using.—ED.

THE RESULT OF STIMULATIVE FEEDING.

We fed our bees most of the summer with sugar and water (half parts), with a little pepsin in each teacupful, and it seemed to have a wonderful effect on them. From six colonies we got 570 lbs. pure clover and sage honey, as follows: 120 lbs., 110, 90, 60, 85, 105, with enough left for winter use. Our friend Mr. Flower, at Ashbourne, who has had bees for years, thought he had a good year, and got only 500 lbs. from 10 colonies. He was amazed at our report, as we live only about 4 miles apart. Can you account for such a big difference in the amount of honey obtained? We think it is due to giving them pepsin in the sugar and water. Do you think that would make them do any better?

Ogontz, Penn., Dec. 5. W. O. JENKS.

[We don't know about the pepsin, but should incline to the opinion that it has no effect.—ED.]

DOVETAILED HIVE INDORSED; SUGGESTIONS AND CRITICISMS; SHALLOW BROOD-CHAMBER, ETC.

As to the "best hive," I suppose there will be differences of opinions just so long as men, conditions, circumstances, and localities differ. But as for myself, let me say, that, for the production of either extracted or comb honey, for adaptability to varying conditions, convenience, simplicity, and cheapness, Dr. Miller or any other man will have a difficult task in finding a better hive than the Dovetailed in some one of its improved forms; especially should one starting a new apiarian outfit weigh well the great advantage found in the fact that this hive is being manufactured along the line of scientific developments; and when we study the history of the past it is wonderful to note how the changes and improvements have been so adjusted that those who used them could keep right along with the advance without pecuniary loss.

In view of what I have said it is certainly with much hesitancy that I make a few suggestions. First, I hope you will hold on to the improved Hoffman frames. That they are superior to those enlarged at the ends, I am sure such a genius as Dr. Miller would soon discover after practical trial. As to the V edge, I care but little. Some colonies fill up the space with propolis, others do not; and as for killing the bees—why, it simply cuts them in two, while the flat edges mash them. The fact is, however, by gently pushing one frame against the other, and withdrawing it once or twice, we may avoid killing any bees with either. I believe there is less propolis generally with the flat edges, especially when the wedge is used behind the division-board, and all keyed up, which I always do.

Now as to the "bee-space" of the Dovetailed hive as manufactured at Medina, I wish it were increased to $\frac{3}{8}$, or at least $\frac{5}{16}$ of an inch. My experience has been, more propolis, burr and brace comb, with the less than with the greater space, especially between the top and bottom super when both are in; and between the super and top do we find more propolis than when the space is decidedly $\frac{5}{16}$ or $\frac{3}{8}$. The structure of the super as now made is for $\frac{1}{4}$-in. space; and let me say, Bro. Root, you allow nothing for the smoothing-plane, which I will use, though the boards as they come from the factory are as smooth as any of that class of work ever turned out from any factory in the land, I believe. Well, this very little shaving is taken off the super edges, and now sometimes the sections, when placed in the holders, will not go down, all of them at least, so as to leave a full $\frac{1}{4}$-inch bee-space; and whenever it is *less*, as, for instance, when a section springs up, *there* you will find propolis. I tacked a strip $\frac{1}{16}$ inch all around a number of supers last season, and, without one exception, I found less propolis. I am forced to the conclusion that bees will put propolis in a space the least fraction under $\frac{1}{4}$ inch, *certain*. Better, then, construct for $\frac{5}{16}$, and when, unavoidably, we have *less* or *more* by $\frac{1}{16}$, all will be well.

Pardon me now if I seem to grow bolder with my suggestions; but I am growing in love with shallow frames; and, unless I have had a peculiar experience, what is now the dovetailed super, with certain changes, is the coming hive.

Friend Root, let me ask you and Dr. Miller to pay attention to this: Let the factory at Medina make for the coming season some dovetailed supers, increased to full 5 inches in depth; then rabbet out sufficiently to receive the usual tin rabbet. Make, for these, frames of the improved Hoff. style, with top-bar $\frac{1}{2}$ inch thick, and bottom-bar $\frac{1}{4}$ inch thick, and *same width* of top-bar, or else you will surely have burr-combs. Key up all with the usual follower and wedge. Let the bee-space throughout be $\frac{5}{16}$. Send out a number of these to your customers (free, if you like — I'll take quite a good many at that), and then see what you shall see, and hear what you shall hear. For making nuclei; for queen-rearing; for doubling weak swarms; for adaptability to capacity of queen; for production of either comb or extracted honey, or both; for wintering; for favorable manipulation in brood-rearing in spring, and for economy of time in handling, such a hive offers advantages which those only will ever know who give them a faithful trial. Two or three

of them might be used for brood-chamber, according to capacity of queen. They could be tiered up indefinitely for extracted honey, or the supers and frames sent undisturbed to market, and sold as comb honey, by fitting on a thin bottom and top. This is for our local market, where super and frames could be returned. The usual super for holders and sections could be used for surplus when desired. Should these five-inch supers prove unsatisfactory as brood-chambers, the purchaser could utilize them for extracting-supers, for which they are far superior to the deeper frames, or simply strike off with a plane from the upper edge the extra ¼ inch, and he would have the super as it now is to be used for section comb honey.

How nearly this might infringe upon the patent rights of others, I am not able to say. In point of arrangement, dimensions, and adjustability to hives of your own construction, you would occupy a great vantage ground, especially toward your own customers, and could afford to pay proper and reasonable royalty.

LANGDON NON-SWARMER NOT A FAILURE.

Now one word for the Langdon non-swarmer. It was not altogether a failure with me. The third day after pushing the slide on a colony I would withdraw it, and push in a slide with a notch cut near one end, 1½ inches long by ⅜ deep, thus affording ingress and egress to the young bees on the side farthest from the now open companion hive. The bees coming out by the cone from the hive on which the slide was last pushed, *take the course* by the *third* day, alighting near the tunnel of the non-swarmer, and turning immediately into the other hive. The notch in the slide being farthest from the tunnel, they never notice it. Thus, after the third day the young bees nearly ready for flight and work when the slide was pushed, are released, and work goes on in both hives until the *sixth* day, when the slide is changed. I lost no queens, bees, nor larvæ, and made some honey, though the last was decidedly an "off" season in this section.

Mr. Editor, stand by your "footnotes."

Glasgow, Ky., Dec. 23. F. G. RAILEY.

[Regarding bee-spaces, the majority of testimony we have received seems to point toward the ¼-inch or scant ¼-inch space as being the best. See what Mr. Kretchmer has to say on this same point in the next column. Two or three years ago, when the question came up, the ⅜ space was roundly condemned, and $\frac{5}{16}$ was considered about right; but latterly we have been asked to reduce it to ¼, because, it was said, it was the least liable of any of the spaces to have propolis or burr-combs. We admit that, if the space gets down to ⅛, or that room through which a bee can not pass, propolis will be deposited. But we have intended to make all our super arrangements so that the space would never get less than $\frac{3}{16}$. However, we are open to conviction; and while we can not remedy those hives already out, we can make right those hives for the future, providing we have enough testimony that will show us, without a doubt, that our present spaces need changing. By following this policy we shall get a trifle nearer, perhaps, to the right thing than we have even yet attained to.

Regarding the shallow-depth brood-chambers or extracting supers, you have, perhaps, noticed on page 900 what we have already advertised. It is 4½ inches deep, because the regular Dovetailed-hive super is that depth, and because it was just exactly half the depth of a regular body. You see, we chose that depth so that the bee-keeper, who has regular Dovetailed-hive bodies, and desires to change to shallow bodies, can do so by simply sawing them transversely through the middle; they should be taken to the nearest planing-mill, where they can be sawed on a buzz-saw more accurately and cheaply. After cutting out a rabbet in each end of one of the halves thus made from the body, the regular half-depth frames will fit.

As you said at the outset of your article, we desire to make all changes or innovations in such a way as to make the least trouble to the bee-keeper, and the least confusion when used in connection with appliances already in use; but the 5-inch depth would be at variance with this policy. After all, how much advantage would there be in adding the ½ inch to the 4½ inches, as you suggest, when so many good points will be lost?

Regarding the brood-frames, we make half-depth Hoffman frames as you suggest; but we think, for extracting purposes, the frames shown at C C, page 900, Dec. 1, would be preferable. These have top-bars ⅞-inch thick and $1\frac{1}{16}$ inches wide; end-bars ¼ x $1\frac{1}{16}$; bottom-bars are $\frac{3}{16}$ x ⅜. This gives a clear comb space of 4 inches. The particular advantage of this bottom-bar is that, when the super is turned upside down, the combs can be more readily examined without removing them from their position.—ED.]

THE HOFFMAN FRAME AND ITS CONSTRUCTION.

Friend Root:—After seeing your request for further reports concerning bottom-bars to brood-frames, I looked over considerable correspondence, filed away with other letters containing references on various subjects, and my own use of various forms of frames enables me to make the following report:

The top-bar, when $1\frac{1}{16}$ inches wide, and from ⅞ to ⅞ inch thick, and correctly spaced 1⅜ inches from center to center, does prevent brace-combs between the frame-tops; and when thus spaced, and the bee-space between frame-tops and the bottom of the super does not exceed ¼ inch, almost no burr-combs are to be found.

As far back as 1864 I used frame-tops, which, in their earlier form, were touching each other nearly the entire length; later, only at their ends; but I have entirely discarded that form for frame-tops of equal width throughout their entire length. Frame-tops, wide at the ends, are objectionable because they are more securely propolized at the ends to the back wall of the rabbet which supports them. With the narrow top, even after being in use for several years, and cold weather renders propolis a little harder to break, we can readily loosen a narrow-top frame by placing our screwdriver, or similar tool used in opening hives, on the rabbet, and quickly pry them loose.

The correct spacing is certainly most effectually done by having the upper end of the frame-ends widened to the proper width, while ⅜ or ¾ of the lower portion of said frame-end should not be more than ⅞ inch wide. Now, some objections that have been made to this widened part of the frame-end are, that the shoulder thus formed catches on the next frame already in the hive; but a correspondence on that subject usually led to the fact that said offset or shoulder was almost square, whereas it should be with a beveled slope, which actually assists in guiding the frame into proper position. As to whether one edge should be beveled or both square, my correspondents differ; but the greater number seem to favor the beveled or V'd edge.

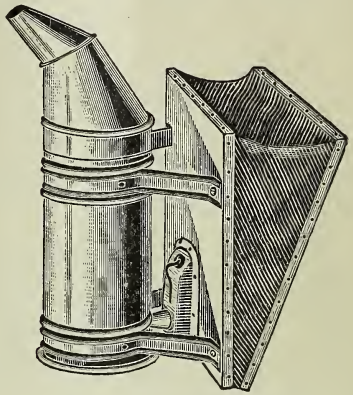
Years ago we made "all-wood" brood-frames, as a matter of simplicity in their manufacture, with bottom-bars ⅜ inch square; and of these we used several hundreds for years; and while the bees would build their comb a little nearer to the bottom, they sometimes would build past the bar, especially after being in use five or more years, and when one side of the comb became more distended than the other side, or when, from some cause, a hive should be tipped a little to one side; but when such frames were used in an upper story for extracted honey they will ruinously build past the bottom-bar and down unto the brood-frame tops; and, even when using them over Hoffman frames, with proper spacing, the combs would be built past. But now we have entirely discarded that width, preferring a frame-bottom not less than ¾ inch wide, and not more than ¼ inch thick. Before making the change, and before we decided what size of bottom-bar would be best, I counseled with numerous extensive bee-keepers, at conventions and by correspondence, and their preference seemed to be for a bottom-bar of the above-named size and shape. E. KRETCHMER.

Red Oak, Iowa, Dec. 23.

[Mr. Kretchmer's article, together with the others that have been received, argue strongly for a wider bottom-bar. A few more such letters will lead us to believe that the change would be desirable.—ED.]

CRANE SMOKER.

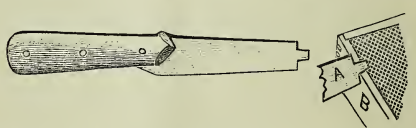
After testing the Crane smoker for some months, we found it would be improved by putting in a little spring to assist the special check-valve. We found the spring was neces-



sary to make it respond more quickly. Creosote would sometimes make the hinge work a little hard.

SCRAPING KNIVES FOR SCRAPING SECTIONS.

The engraving below represents a little tool that was handed us at the Big Convention in Chicago, by a bee-keeper whose name we seem to have mislaid. At all events, the engraving will explain the idea. When we saw the implement we were at once convinced it was a good thing; but it seems, from one of Dr. Miller's Stray Straws, that he has tried a similar tool, and has not found it to be as good as an ordinary case-knife because the latter will scrape clear across the surface of the section. But, doctor, why couldn't your long case-knife be notched on the end as shown in the engraving, so that you could, when desired, scrape around in the corners? You know the square corners or shoulders are supposed to prevent the point of the knife from gashing up into the comb. They are designed, also, to scrape two surfaces at once—the perpendicular edge, and the inside edge of the section at right angles to it, both at one sweep of the knife. We have not tried this implement, but saw it used in



scraping a couple of sections. Any case-knife can be ground or filed off so as to make these notches; and, even if the notches prove to be of no particular value, as Dr. Miller and Miss Wilson seem to think, there is very little expense incurred in notching out the knife; and, even if you don't want it, put it on the grindstone and restore the end of its blade "to its former condition."

Whosoever shall exalt himself shall be abased; and he that shall humble himself shall be exalted.—MATT. 23:12.

FOR some reason or other we are just now having the largest number of orders for renewals to GLEANINGS we ever had—and this in spite of the hard times. As we have not been making any great spread in the way of premiums and other devices to swell our list, we can not conceive why the renewing should be so general unless—well, our extreme modesty forbids our filling out the sentence.

ON page 275, 1893, appeared a clipping from a paper, to the effect that Mr. J. A. Buchanan not only adulterated honey with glucose, but pleaded guilty. In the next issue we published a letter from Mr. Buchanan which showed that he had been made the victim of spite, and at the time we were entirely satisfied that he was innocent. Lately we have been informed that one of his accusers has had to flee from the hands of justice because of some rascality. The record of this person is altogether crooked, while that of Mr. Buchanan has been, so far as we can ascertain, straight and honorable.

DR. MILLER says, in Straws, we should say "quiet robbing to *prevent* robbing," rather than "quiet robbing to *stop* robbing." We borrowed the expression from no less a scholar than friend Hasty, on page 359 of the *Bee-keepers' Review*. Either form may be correct, whichever view you take of it. One time last summer our honey-house door *somehow* got open. Closing the door without giving the bees something else to pounce on to would have been disastrous to small nuclei throughout the apiary. Our stacked-up hives containing a wee entrance at the time were not operating, simply for the reason that bees had used up all the stores in them. We put combs into them, closed up the honey-house door, and the robbers turned their noses immediately toward the stacked-up hives. Here, doctor, was not a case of *preventing*, but one of *stopping* something that was already existing. You know, "like cures like;" and, if we admit your view, "like prevents like."

NEGATIVE AND POSITIVE TESTIMONY ON THE DISCUSSION IN THIS ISSUE.

THE discussion in this issue, as to whether the bees perform any valuable part in the fertilization of blossoms, leans strongly to the side of the bee. Mr. Fultz' article, one of the best we have ever read on the "other side," combats some claims that we do not *think* are made by bee-keepers or by their representative bee-papers; see p. 49; and in the second place, his arguments are based largely on *negative* testimony—that is, proof of something he has *not* seen—while Prof. Cook and the rest rely upon positive facts and positive figures. For instance, if A steals a sheep of B, and C, when placed on the witness-stand, says A did not steal the sheep, because he, C, did not see him do so, the evidence is weak. But if D, when placed on the stand, says he actually saw A carry off one of B's sheep and put it among his own, his testimony would be positive; and the testimony of two such men would convict A of theft in spite of "bushels" of negative testimony. Mr. Fultz says, in effect, that he does not believe that bees fertiiize blossoms, because he sees no evidence of it; *but other good witnesses do.*

CANDYING OF HONEY NO PROOF OF PURITY.

WE want to iterate and reiterate again, that the candying of extracted honey is no proof of its purity. Nearly a year ago we adulterated, as stated in another column, for the purpose of experiment, several samples of honey with glucose. Into one we put 25 per cent; into another, 33⅓; another ½, and another ⅔. These samples were all put into a close cupboard, together with another sample of pure honey. At this date every one of them is candied; but the candying is less solid, in proportion to the amount of glucose in the honey; and while we think we might be able to recognize the presence of glucose by the peculiar way the honey candies, it is doubtful whether the average bee-keeper or consumer could do so without having made previous experiments with several samples, such as we have. You see, the matter stands this way: If the general public believes that candying is the best proof of purity, the glucose-mixer can show that his samples of glucosed honey (which he will, of course, call strictly pure) will candy; and there was a time, a year or so ago, when bee-keepers would be perfectly satisfied with any sample that showed a tendency to granulate. We desire, therefore, to correct this impression as speedily as possible.

Unfortunately we have several thousand labels (for you know we have quite a business in that line) printed ahead, in which the wording occurs, that "candying is the best proof of purity." Just as soon as these labels can be changed it will be done.

A DISTINGUISHED VISITOR.

WE have just been favored with a visit from Dr. A. Vergel de Dios, of Manilla, Philippine Islands. Mr. D. is a physician and dentist, and has followed that profession in Paris, France, for the last six years, and has also studied at the University of Pennsylvania, for about a year and a half. While at the World's Fair he learned of the existence of the

Home of the Honey-bees, and resolved to pay us a visit. He speaks Spanish as his native tongue, although he belongs to that great division of the human family known as the Malay. He also speaks French perfectly, and a little English. After making a tour through all the different rooms of this establishment he could not express his surprise at the wonderful development of apiculture in this country. Mr. D. is a highly intelligent Christian gentleman, and a living proof of the elevating influence of Christianity and Western civilization. We hope he will always remember his visit here with as much pleasure as we shall always remember him. He says there are no regular hives used in his country, but still he is very desirous of introducing our strains of bees there as well as our hives. He has promised to give us several articles in regard to his country as soon as he returns—its flora, climate, and general features. They will, of course, appear as translations, as he writes in Spanish.

HONEY STATISTICS UNRELIABLE.

WE are often asked for statistics regarding the amount of honey and beeswax annually produced in the United States, and, in some cases, for some particular States. So far as we know, there are none that have ever been made that are at all reliable. Some fair guesses were made; but later developments would seem to indicate that these were very far from being correct. There were a few statistics published a few years ago by the government, but they gave South Carolina the credit of producing the largest amount of honey; but California, by all odds the leader in honey-production, was put at the bottom of the list. Of course, every reader of our journal knows that this is manifestly incorrect.

From the best information we have as honey-buyers, and from correspondence we have had with some of the largest honey-buyers and honey producers, we would, unhesitatingly, place California far in the lead as a producer of honey. Just what State should rank next is a little hard to say: but those in the front ranks will be New York, Pennsylvania, Wisconsin, Texas, Illinois, Arizona, Colorado, Missouri, Kansas—well, we can not go further, because we should have to guess at the others. Michigan used to rank among the best, but lately its crops have been very meager. Our own State of Ohio has never made any very great show, principally because it is too agricultural.

ADULTERATING HONEY.

FOR a month or so back we have received several letters to the effect that Mr. F. H. Hunt, of Redlands, Cal., has been adulterating honey with glucose. Genera Manager Newman, of the Bee-keepers' Union, to whom the matter has been referred, has also received some correspondence to the same effect, and says, in the *American Bee Journal*, that, if this Mr. Hunt is the same one who lived at Center Point, Ia., he is at his old tricks again; and then he refers to pages 424, 475, 492, 563, and 724 of the *American Bee Journal* for 1884. Not wishing to do Mr. Hunt any injustice, we have been careful to weigh all the evidence. We have written him twice for his side, and, although he has had plenty of time, he makes no reply.

It is alleged that Mr. Hunt brought a carload of honey from California, and mixed with it a carload of "stuff," which he obtained from the East, in St. Paul, Minn. Here is a little of the evidence:

J. Gehring, being duly sworn, says that, in the middle or latter part of September, 1893, he took his little steam-boiler, and helped Mr. Hunt mix together, and put into tin cans and Mason pint jars, what he, Mr. Hunt, called honey and glucose. This affidavit is dated St. Paul, Jan. 4, 1894, and bears the seal of the Supreme Court of the State of Minnesota.

J. C. Acklin, being duly sworn, says that, in the middle or latter part of September, 1893, he was in where Mr. F. H. Hunt, of Redlands, Cal., was mixing honey with some stuff that came to St. Paul in barrels unmarked, and which Mr. Hunt said was glucose; that he, Acklin, saw the honey and stuff mixed together and put into tin cans. He got a sample of the "stuff" from one of the barrels while it was being emptied, and now has it in his possession. This affidavit also bears the seal of Minnesota, and is dated at St. Paul, Jan. 4, 1894.

The following is a report from the State Dairy and Food Commissioner of that State, relative to that matter:

[Copy.]

INSPECTOR'S MISCELLANEOUS CARD.

STATE DAIRY AND FOOD COMMISSION.

No. of Sample, 18.
Date of Purchase, Dec. 17, 1893.
Character of Sample, strained honey.
Stored with Smith & Austrian.
City or Town, St. Paul, Minn.
Manufacturer, F. H. Hunt, Redlands, Cal.
Inspectors, J. M. Bohrer and E. B. Williams.

HONEY ANALYSIS.

Dec. 29, 1893.

Polarization direct, +85.5; normal at 20° C.
Correction, 4.4
89.9
Polarization indirect at 20 $\frac{m}{c}$, 39.9
Correction, 4.4
44.3

Sucrose, 1.00 %.
Reducing sugar, 57.10
Ash, .76. Dextrine present
Remarks.—At least 75 per cent glucose.
Chemist.—E. N. Eaton.

Comment on the above by us is unnecessary.

It is sufficient to say, that we have n our possession the affidavits and the report, also bearing the seal of Minnesota, together with a lot of other correspondence to the same effect, from various parties. The General Manager of the Union, and also the Food Commissioners of Minnesota, have the matter in hand, and no doubt they will make things a little interesting —for somebody.

SIMPLE METHODS OF DETECTING GLUCOSE IN HONEY.

On page 810 of the *American Bee Journal* for Dec. 28 is an inquiry from a subscriber asking whether there is any simple way of testing extracted honey to find out whether it is mixed with any thing besides honey. The writer then goes on to say that he saw an item in a local paper, to the effect that glucose could be recognized in honey by the use of alcohol. In reply, the editor says he does not know of any easy way that such tests can be made, and, moreover, doubts whether there are any reliable simple tests. However, he sent the recipe to one of the veteran bee-keepers, who, after introducing four times the bulk of alcohol into a certain quantity of *honey of known purity*, and shaking it thoroughly, as directed, says:

"The only result that I can see is, that the *alcohol* looks a little milky. The honey all stays at the bottom. According to that test, I have never produced a pound of pure honey in my life."

The italics in the quotation above are ours, and we shall refer to it further on.

On page 103 of GLEANINGS for Feb. 1, 1893, it will be remembered that we spoke of a test that was made at a Michigan State bee-keepers' convention, by Prof. Cook, who himself introduced varying quantities of glucose into some samples of pure extracted honey. No one but himself knew the proportions. A testing committee was appointed, to see how nearly they could determine the relative amount of glucose in each by the *taste*. The report shows that the committee, while unable to give the exact proportions of honey and glucose, detected the "doctored" samples unerringly, and were close enough to say that one sample contained more than another. The report of this appeared on page 50, Vol. XXXI., of the *American Bee Journal*.

Wishing at the time to disprove or corroborate, as the case might be, this experiment, we told our apiarist to adulterate several samples of pure honey, each sample to have a different proportion of glucose. The samples were numbered, and he only was to know the proportions. The writer and Mr. W. P. Root, our stenographer, were the testing committee; and, as we reported at the time on page 103, we were able to detect each glucosed sample, without a single mistake; and not only that, we gave very correctly the comparative amounts of glucose in each sample. The point we wished to make was, that glucose could be readily detected by the taste; that no experienced honey-buyer should be deceived in the goods he was buying.

On page 255 of our issue for April 1 appeared an extract from the *Bienen-Vater*, which told how to detect various adulterations in honey. Among them was a simple recipe for detecting glucose by alcohol in extracted honey. It is as follows:

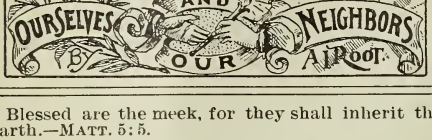
Take a tablespoonful of honey to be tested; pour it into a small bottle, and then add three spoonfuls of pure spirit, and shake the whole together thoroughly. In about a quarter of an hour there will form in the bottle a cloudy, whitish sediment; and from this one may be sure the honey is adulterated.

On page 275 of the same issue, April 1, we related having tested samples of glucosed honey; and the result was, we detected every doctored sample.

"Now," we quote, "to make sure the test was reliable, we also procured a sample of basswood honey that we knew to be pure. . . . . On putting the honey to the test, the alcohol had no perceptible influence on it, and the *honey* remained as clear and limpid as before."

Observe the italics we put in this time. You will notice at the outset, that "Veteran Bee-keeper," who made the test for the *American Bee Journal*, says that the only result that he could see was that the *alcohol* looked a little milky. When the test is correctly made, as given in the quotation from the *Bienen-Vater*, glucosed samples will show that the *honey*, when glucosed, is perceptibly cloudy according to the amount of adulterant. On samples of pure honey, the alcohol has no effect, but rises to the top, and looks a little milky, just as "Veteran Bee-keeper" says; but this is no evidence that the honey is impure. He did not go far enough in his experiments, because he tried only *pure* honey. Had he also tried several samples of *glucosed* honey he would have soon noted a marked difference.

We do not call attention to these matters by way of correction, to find fault with that excellent bee-periodical, the *American Bee Journal*. We simply desire to show that their "Veteran Bee-keeper" did not make the test *sufficiently thorough*, and that he did not read the result correctly. In the second place, if there are simple and reliable tests for detecting glucose in honey, we must not let the impression get abroad among the would-be adulterators that there are no such tests, because they will use it as a screen. In fact, we have known them to say that they could adulterate if they wanted to, for there were no means of detecting the adulteration. They are mistaken. If they knew that there are simple tests by which we can follow them up and make it *hot* for them, they will be a little cautious before they attempt such a business.



Blessed are the meek, for they shall inherit the earth.—MATT. 5:5.

PLEASANT SURPRISES.

Perhaps some of the friends may think my subject inopportune at this crisis of financial affairs, when so many are out of employment, a good many in want, and a general disposition to say that farming does not pay; when those who ought to be able to advise, recommend that the unemployed turn to agriculture and our broad acres, rather than do nothing and see their families suffer. In fact, I have feared that some might suggest that we have plenty of surprises, without question, but that they are mostly of another kind rather than pleasant surprises. But notwithstanding all these drawbacks, I do believe we may so live that this world of ours shall have in store for us pleasant surprises every now and then. In one sense we may look for them. In another sense, we should attend to business, attend to duty, and *not* look for them. If we were looking for them all the time they wouldn't be "surprises," you know. I *do* believe that the meek shall inherit the earth; but the tendency of Young America nowadays is too much like this: Somebody has worked a while, and done pretty well. Then he turns around and says, "Now, look here. I have been meek a long while, but I have not inherited the earth, nor hardly even the smallest part of it." The trouble is, we are looking too much toward the reward, and we are working for the reward; and, if I understand it, this is not meekness at all; and the same way with these pleasant surprises that I am sure a Christian will find if he does not get weary in well-doing. In the first place, we must not *expect* too much. We want to look out for the idea embodied in the expression, "The world *owes* me a living." It is a bad doctrine. We want to start out with the idea that the world does not owe us any thing; and we want to encourage more, I am sure, the thought that the world generally *pays* what it owes. Sometimes this great busy world is a little slow and a little dull in recognizing what it owes; but I have sometimes had a pleasant surprise in finding the great busy world a little *too* ready to pay what it owes—or more than it owes. I have seen intemperate men reform, and start out to do well; and I have sometimes felt sad to think that this great busy world, or at least a small part of it, had made a blunder in making too *much* of the reformed man. Perhaps the world discovered the blunder; and can we blame the people if they said to themselves, "Now, look here; when another man starts out, or *says* he has started out to lead a new life, I guess we had better wait a while, and see how well he holds out before we begin throwing favors in his way, and putting grave responsibilities upon his shoulders"? So if we decide in the outset that the world, generally speaking, will recognize us for all we are worth, in due time, I think we have made a good start. Blessed are the meek, for they shall inherit the earth.

One must not expect too much of the world if he is going to start out for pleasant surprises. He must not demand too much of his good wife; he must not demand too much of his children; he must not demand too much of his neighbors; of the hired man; or of his employer; of the teacher; of the minister. You see, if he starts out demanding or expecting every one to come fully up to *his* standard of things, he will be continually disappointed. His surprises will be *un*pleasant ones instead of pleasant. He must be meek and quiet, and cool and gentle. I do not by any means mean he should not be a pusher—God forbid! He can be a veritable "hustler," and still be meek. Please do not get the idea, dear friends, that I think I am this myself, for I know I am nothing near it; yet I have glimpses occasionally of the wonderful things that may be done in that direction. I have told you how I generally get such glimpses. I plead vehemently for something I think ought to be done. Perhaps it is in my power to have it done instantly, if I use my authority, and demand that it be done. I do not like to do this. It is not well. A meek man should be very careful indeed about saying this *shall* or *shall not* be so. Well, after I have pleaded pleasantly but vehemently, and have met only opposition, a good many times I settle down sadly, and perhaps sorrowfully, feeling that I am right, and that it is hard to meet objections when I am laboring only for the good of those in question. A good many times I decide that about the only thing that can be done is to pray for the stubborn one, and ask God's help; then afterward, when I find the person or persons, as it may be, have changed entirely, and go to work with cheerfulness and alacrity for the very thing I urged, *then* I have my pleasant surprises. You may say that, if I believe in prayer, there should be no surprises at all. But look here, my friend. When I pray that certain things may be brought about, I do not always feel sure that it is the *best* thing. *God* knows, but *I* do not; therefore, when I discover that the great God above has recognized my convictions as good and true ones, I have a double surprise—first, because the thing I wanted to see done has already been done; secondly, because it seems as if God *indorsed* my course. And by the way, dear friends, I wonder whether you have yet discovered that the quickest way of succeeding, oftentimes, with stubborn people, is to stop arguing or pleading entirely, and plead with the great God above.

One who would keep himself in favorable condition for pleasant surprises should be careful about being in debt. Let me digress a little. Last summer the Weather Bureau was severely censured because it predicted rain, and rain did not come. I imagine, after this these government officials got to be a little more careful, for toward the close of our drouth they worded their telegrams a little differently. Instead of saying so positively that it *would* rain on such a day, the telegram would read, "The conditions will be *favorable* for rain on Thursday afternoon." I sometimes wish the *flag* that they furnish, to run up on the top of our water-tower, had something printed on it to the effect that the *conditions* are favorable, instead of saying squarely, rain is coming. Well, now, it is so with these pleasant surprises. Nothing in this world will bring them about positively, that I know of; or, perhaps I should say, at any specific time. We can so live, however, that the conditions are *exceedingly favorable* for happy surprises. Well, what are these conditions? First, meekness, according to our text. Sometimes, however, we meet a *kind of* meekness that is exceedingly provoking. We have a man up in our jail just now who came along as a tramp. He went into a house, and, finding nobody at home except a girl of fifteen, demanded that she instantly set to work to get him a good square meal. Then he asked a blessing over it, and, I think, repeated some Bible texts. Before he left he managed to steal a watch. When I remonstrated with him about his inconsistency he repeated the text, "Judge not, that ye be not judged." I told him, however, that there

are times when it is our duty to judge, and I made him assent to it. He then, with great meekness, quoted another Bible text—"Let him that stole, steal no more;" and he said it very sweetly and pleasantly. Lest some of our unbelieving friends, however, should want to stand up right here and tell me that this fellow was a fair sample of our good Christians, I think I had better make haste to tell you that the fellow had escaped from an asylum, and is going to be sent back as soon as we can find where he belongs. We do not want any such meekness as this; and I am really afraid that our crazy friend in jail is not the only one who has made sad blunders along that line. Such people are not in condition for pleasant surprises. I do not think his was a pleasant one when the sheriff laid his hand on the fellow's shoulder; neither will yours be, my friend, if you depart from reason and common sense. Let us now go back to the matter of being in debt. If you are owing that which you ought to pay, and are unable to pay, you are in great danger of meeting surprises; and I am pretty sure they will not be *pleasant* ones. A good many will say, "But I could not help being in debt. If I tell you the circumstances, I am sure you will say there was no other way to do."

There *may* be circumstances, I am well aware, when one can not avoid running in debt—in fact, where he would be doing very wrong indeed if he did not get help from his friends; but there are ever so many more cases where people think they must go in debt where they need not do so. Oh how hard it is for the world to learn that it is *not* so *very* hard to make your expenses come inside of your income! Our parents away back did it—not so very far back, either, for some of us can well remember the time when mother made starch from potato-parings, and twisted up strips of paper to save buying matches; blew out the candles when nobody was reading; put in just wood enough to warm the one stove in the house until all went to bed, and practiced economy in a line with the above, clear through the whole household. Why, I can remember when people did not have any money at all from one month till the next. They generally scraped up enough to pay taxes, and that was about all. Everybody else had to take something they had to sell, or they went and worked it out. I am sure it would not hurt the United States of America a bit just now to explore a little in that direction. It is like a good many other things. When you first undertake it, you think you can not stand it; but by and by, after you have tried it a while, you smile to think of what a fuss you made of it at first. I think I could let half a dozen bees alight on my hand, and sting their very worst, one after another, and I do not think I should make a very wry face. Now, do not say I am boasting, for I have no more grit to endure pain than other people—hardly as much. I used to make an awful fuss about a bee-sting; but it was only after I had "learned the trade" that I discovered I could let them sting, if necessary, and go right on with my work. Now, when we learn to make expenses come inside of the income, even though it hurts like letting the bees go on stinging, then we are getting down to a sort of bedrock where pleasant surprises are likely to await us every day; and it does not hurt us very bad either, if we get a little adjusted to the new order of things.

Now a word about depriving ourselves in order to keep out of debt. When I was 16 years old my clothes were quite shabby, and I had no money to buy better ones. Somebody suggested that I might go and get better ones, and pay for them when I got the money. The man at the clothing-store knew my father, and he was kind enough to let me have the clothes, charging them up to me without even asking my father to back me. You see, my father had a reputation for promptness that made his 16-year-old *boy* good, even though the father was not consulted. I wore the clothes until *they* were rather shabby, without paying a copper on them. Then some other kind friend suggested to me that it was a bad way for a boy to get into, wearing his clothes out before they were paid for. At that age I was quite ready to listen to anybody. So I went before night and made arrangements in the way of a sort of trade to have my account crossed off. Now, in all these years since that time no one has ever asked me for the money I owed him, without having his pay, or some satisfactory arrangement made, inside of 24 hours.

There have been times when I have "scrimped myself," as the expression goes, worse than to go hungry in order to keep my reputation good; but I tell you it was a good investment to do so. I learned self-control, and to put up with privations, especially in the way of food, by a sort of accident — at least, I call it that. For four years, while in my teens, I was a vegetarian. I learned by force of will to sit down even at a thanksgiving dinner and eat nothing but vegetable food. The memory and experience of those four years have made it comparatively easy all through life to go without different things when my better judgment told me I could not afford it; and this very thing has helped to give me happy surprises. Many times, after I have cheerfully consented to forego or give up something I greatly desired, I have had pleasant surprises in finding the very thing I coveted placed right where I could get it easily, or, perhaps I had better say, *honestly*. People are tempted to be dishonest because they want a thing terribly bad, that they *can not* have honestly. Well, when one decides that he is going to have something, no matter whether he gets it honestly or dishonestly—he is going to have it any way—then good-by to happy surprises. He hardly need expect them any more. I have told you many times how I have longed for a glass of beer. If I could sit down at a table with friends, and drink all the lager beer I wanted, just as the crowds were doing at the World's Fair, I am afraid I should be foolish enough to give quite a sum of money—that is, if I could do it *honestly*. If I could not do it honestly, then I don't want it. A young friend of mine united with one of the churches in our town, not many years ago. I knew what his life had been; and when I took him by the hand and told him how glad I felt to hear the good news, it was really one of my pleasant surprises. I felt afraid, however, he did not realize what he had been doing, and feared he had united with the church on the impulse of the moment. I do not think he had any idea of the Bible, and perhaps but little of Christianity in general. He knew this, however, that, if he were going to be a Christian, he would have to stop drinking beer. He united with the church some time in the spring. Somebody told me he said, a few days before the Fourth of July, he was going to have all the beer he could drink on the Fourth of July, religion or no religion. As soon as I heard it, however, it occurred to me that, but for the grace of God, there was a picture of A. I. Root exactly. How naturally self would prompt me to make just such a speech, and, worse still, put it into execution! My friends, if you know nothing of the appetite for beer, you *do* know, doubtless, of the terrible longing that comes at times after other things that are sinful. Some one may ask, "Well, could not the boy be a Christian and have his beer on the Fourth of July?"

Let me ask *you* a question: Could a boy be a Christian and get drunk on the Fourth of July—or *any other day?* I do not think I have ever found anybody, unless he was intoxicated, who had the hardihood to say a man can be a Christian, and at the same time deliberately get intoxicated. By the way, why is it that all intemperate men, and especially all drunken men, are so vehemently bitter in their curses and denunciations of every thing pertaining to the Bible, or even God as the ruler of the universe? It is because God and the Bible suggest self-control, and fighting against sin.

Now, then, if you are going to have the "conditions favorable" for pleasant surprises, you must have a *clear conscience.* Perhaps there is no happy surprise in one's whole life of experience, like the thrill that comes over us when we see our children doing well. I met a man the other day whose face was so beaming with happiness and good nature that it surprised me. When I ask him what it meant he said, "John has finally come out a Christian, and is going to unite with the church at the next communion."

I replied, "Well, that is good news. So you finally succeeded in getting him past his stumbling-blocks, did you?"

"No, I didn't have any thing to do with it—or, at least, it seems as if I didn't. After I gave up talking with him about it, he announced of his own accord that he had come out for once and for all on the side of Christianity."

This was indeed a pleasant surprise. But the father *did* have something to do with it, even if he did not know it. He is a good square Christian man; and by the way, my friend, if you wish to have the conditions favorable for pleasant surprises in regard to your children, *be careful.* Not only must you be careful before them, but be careful when they are not anywhere in your sight. Be careful in the darkness of the night, when no soul is near. You may say, "I would not have my boy know this for all the world; but there is no possibility of his ever finding it out." You are wrong. You are making a *fearful* blunder. Every dishonest or impure act stamps itself all over the man. It stamps itself on your looks, on your acts, and on your mind; and your looks and your actions and your mind are molding and fashioning the lives of your children—especially your boys. I have been told that some temperance lecturers give excellent temperance addresses, and do a great amount of good, while they are, right along, drinking on the sly. It is not true; it is a foul slander on humanity and on God. It is true, a bad man may read the Bible to an audience; and the words that he reads or the texts he quotes may do some good; but when the man's real life comes out it is a question whether the damage he has done does not far overbalance all the good ever accomplished. There can be no real pleasant surprises in the life of a hypocrite. It is the honest man—the conscientious man—who is going to get the most happiness here in this world of ours; and he will, after the end of things earthly, inherit all things. One more point: It is the people who have learned to put up with little; who have learned to live within their incomes; who have learned to be happy and contented where the great masses would growl and complain, who meet with pleasant surprises. If you are contented to-day, and satisfied with what God has seen fit to give you, you are in the very best possible condition, or, in other words, the conditions are favorable (as the Weather Bureau puts it) for many pleasant surprises—yes, for showers of happy surprises, providing said "showers" do not make you proud and arrogant and overbearing, and touchy and snappish, toward your neighbors.

And, finally, after the surprises of this life are *all* ended, the great King of all the earth shall say unto the meek and humble and faithful, "Come, ye blessed of my Father, inherit the kingdom prepared for you from the foundation of the world." We are told in that beautiful figure in the 25th of Matthew, that, when this invitation was made, they to whom it was made were surprised; and when the Lord told them of the good acts they had been performing all through life, they could not remember it. Then he goes into detail, and tells them this wonderful truth—that, when they fed the hungry, gave drink to the thirsty, clothed the naked, etc., they were really doing it unto *him*, and that it was all put down in a book of remembrance; and he closes with these wonderful words:

Verily I say unto you, Inasmuch as ye have done it unto one of the least of these my brethren, ye have done it unto me.

WATER FOR IRRIGATION, FROM UNDERDRAINS, ETC.

If you are so fortunate as to own land located on a higher level than ground you are using for market-garden crops, fruit, etc., you may count yourself as very lucky; and, in fact, almost every land-owner has some land that is higher that others. I will now tell you what you can do. I have frequently spoken to you of our swamp garden; but it never was my own by clear title until last spring. Then, by the death of the owner, I found I would have to vacate it or else pay $500 for a single acre in a piece of land that would hardly sell for $50 an acre. Besides that, the acre I wanted was mostly a sort of frog-pond that the average farmer would hardly take as a gift. Rather than give it up, however, I paid the $500. It was during the hard times too, and mother and the boys felt as if I were almost throwing the money away when I did it. I had a plan in view, however. Just as soon as the ground was all my own I cut underdrains every 20 feet apart, and led them all into a sort of cistern constructed at the lowest point in the center By the way, Prof. Wright, the celebrated Oberlin geologist, told me, some years ago, that this swamp of mine, almost on the summit of quite an elevation, was, in all probability, made by being the resting-place of a huge glacier, ages ago. This glacier was so heavy that it sank into the ground as the waters subsided; and through ages and ages, leaves, sticks, etc., have collected in the cavity, blown in by the wind, until peat was formed, and then rank vegetation assisted in filling the cavity with vegetable matter. In digging out our cistern we found great trunks of trees, several feet below the surface of the swamp.

Well, after my underdraining was completed we started a line of 3-inch tile straight in the direction of our steam-boilers, about a thousand feet distant. As the cistern always contains water, I directed the boys, during our drouth last summer, to lay this last line of tile just under the surface of the water that flowed from the cistern and followed along in the ditch as fast as they dug it. This water following them lubricated their ditching-spades, and rendered the hard clay comparatively soft when otherwise it would have been tremendously hard digging. You see, this line of tile, therefore,

was carried on almost a dead level. It dropped just a little, because the water in the cistern was constantly falling very slowly as they let it off into the ditch. In order to go through the highest land, they had to cut in some places four or five feet deep. This line of tile was carried through a neighbor's land until I reached my own ground again not far from the big windmill. When on the corner of my lot I made another small cistern by setting in the ground (on end) two lengths of 18-inch sewer-pipe. The tile from the swamp emptied into this sewer-pipe about a foot above the bottom. On the opposite side of the sewer-pipe, and 6 inches lower, a 3-inch *iron* pipe with a strainer over the end was put in. This was the outlet. With old discarded boiler-flues that had been accumulating for years, I piped this water clear down to our steam-boilers, and obtained head enough so it would deliver the water into an iron tank located just above the boilers. Well, for two months past, the water from the swamp garden has furnished our boilers, using from 100 to 200 barrels per day. When I explain to you that heretofore we have been pumping water from Champion Brook, 700 feet away, and about 18 feet *below* the boilers, you can understand something what a saving my swamp speculation is making. Another thing, the water from our wells is so hard that it destroys our boiler-flues in a comparatively short period of time. The water from Champion Brook is quite a little better: but still a scale, more or less, is always forming on the flues. The water from the swamp proves to be almost pure soft water; and the saving in flues will pay a big interest on the whole investment. Besides this there is a great saving of coal that was formerly used in pumping water from Champion Brook. The boys and all the rest of the family are, of course, thoroughly converted *now* to the wisdom of my speculation in the swamp. Another thing, I have got thorough control of the water, so I can make it stand at any depth I wish for my celery, onions, or other crops.

Do you want to know what there is to help you in this? Why, it shows you that, with a reservoir to catch the water from your under-drains located higher up, you may have a nice little home-made waterworks, and often get fall enough to cary the water into your barn, stables, and perhaps all through your house, without very much expense either. Where you want to carry the water on a dead level through impervious clay soil, common tiles will do almost as well as any thing. When, however, the fall commences, in order to get a pressure or head on your waterworks you will be compelled to use iron pipe. Old discarded flues or second-hand pipes will often answer an excellent purpose for many years. My flues were all dipped in liquid asphaltum after they were all fitted ready to put together. The consequence is, the water looks and tastes like pure spring water. The underdraining will probably be a good investment any way; and having nice water all over your premises, without any pumping, is a *tremendously* good investment for any home.

A NEW SORT OF CRESS FOR WINTER USE.

Among some of the seed we sowed in the greenhouse last winter, three or four stalks of nasturtiums sprang up. As it seemed a rank grower, and was rather pretty, I let them run; and when the greenhouse was closed up at the approach of winter (almost a year later), there were the plants still growing. When the sash were put on, it seemed to take on new life; and I told the boys to tie up some of the tender green shoots and let them run. To my surprise the plant acted as if it might occupy the whole greenhouse by sending out long slender vines and tendrils; and it seemed as if some of them grew two or three inches in a night. The short days, and the rich compost together, produced a rank growth of light color, something like a potato-shoot growing in the dark. As these tendrils got in my way, I got a fashion of snapping them off and putting them into my mouth. Finally, when they were encroaching on the lettuce I directed one of the boys to trim off a lot of that exuberant foliage. Just as I started away a thought struck me, and I said: "Look here, Frank, take those shoots into the lunch-room and tell them to cut them up and serve them for dinner, with pepper, salt, and vinegar." Everybody who got a taste of it, I guess, wanted more; and one of the boarders asked me afterward where I got water-cress in the month of January. Now, then, if sturtion shoots and leaves would sell for the price of lettuce, or even a little less, what a picnic we shall have in growing it for the markets! After the idea was suggested to me I thought it had a taste remarkably like water-cress. Acting on the suggestion, I had all the little sturtion-plants picked up from among the lettuce, and set in rows by themselves; and who knows but I shall develop a new industry in the way of winter salads? By the way, did any of you ever before hear of serving up sturtions as a table dish?

HEELING IN STRAWBERRIES, RASPBERRIES, ETC., IN EARLY WINTER, TO BE PLANTED OUT IN THE SPRING.

Mr. Root:—Will you please give me your opinion and experience on taking up strawberry and raspberry plants *now* and heeling them in to be set out in spring? I want to move in spring, and take plants with me. I have pulled some and put them in a pit, but I should like to hear from you before I pull more.

J. E. Henderson.

Valley Grove, W. Va., Dec. 19.

[Friend H., I have had no very great experience in this line; but what I have had is against it. While I have at times succeeded in giving the plants as good a place to winter as where they grew originally, most of the time I have failed. They would either be too warm or too cold; or if put into a pit, very likely too damp. In your case I would get the privilege of removing the stuff in the spring. I know that nurserymen recommend this way of doing, and practice it to a great extent; but I shall never buy any more stuff of a nurseryman, if I can help it, that he has wintered over in the cellar so that he can get at it early in the spring. Last spring a firm sent out tremendous advertisements, and gave photographs of great crowds of men putting up trees and plants to ship. These people talked so much about their extra facilities for keeping plants during winter in their nice cellars that I gave them a trial order. We got gooseberries, blackberries, currants, and other hardy plants that are usually almost sure to grow. The shippers were liberal enough to throw in quite a lot of extras; but not half of the plants ever made any start to grow; and they were so feeble, those that did start, I am afraid that scarcely a thing got growth enough during the whole season so as to be ready to take hold and grow next spring.]

TRANSPLANTING-TUBES—A CHEAP WAY OF GETTING THEM.

In towns of only a few thousand inhabitants they often have to hire a team to draw off empty fruit-cans, and dump them, perhaps, down some bank or in some unfrequented place. Not long ago I saw a place where these tin cans

had been dumped by the cartload, so that the owner of the land, when he saw what had been done, placed a notice which said, "$5.00 fine for throwing cans or any other rubbish on these premises." Now, in order to get all we want while they are clean, and before they get rusty, just go to these places (restaurants, etc.), and ask them to save them for you. Leave an empty barrel to put them in as they may accumulate, also ask them to keep them where they will keep dry, so they won't rust. To fix them for use, take a can-opener and cut out one end of the can, leaving a little around the upper edge in order that it may be strong enough so that you can place your foot on it to force it into the ground. The other end you will have to deal with differently. If you have a cook-stove in your back shed or shop you are ready to take off the other end. Heat up the stove and set on a number of the cans, and the solder will melt at once. As you take the cans off the stove, hit them a little rap with the back of a bread-knife, or other suitable article, and off goes the other end. One end of the can is sharp, and the other strong enough so you can place your foot on it.

I spoke of the stove being in a back shed or shop, for the reason that there will be a little of the fruit left in the cans; and if you were to take them into the kitchen, of course an unpleasant odor would arise. You can, if more convenient, take a large griddle, or any iron with a flat surface, and place it on three bricks, outdoors; and with a fire under it you can accomplish the work where it will not trouble any one. W. S. WRIGHT.

Battle Creek, Mich., Dec. 21.

[Very good, friend W. Your suggestion of leaving a ring of metal around the top, to prevent crushing, will, perhaps, make the fruit-cans sufficiently substantial. I have used them; and my objection was, that all the fruit-cans I ever got hold of were made of tin too thin and light. Your improvement would fix the top all right; but if your ground has stones or sticks in it, I fear the lower edge will get badly mashed up in a short time. We make ours of the heaviest tin the tinners can work; but even then we have a good deal of trouble by having it bent and bruised where they strike stones, or where the ground is very hard.] A. I. R.

EXPERIENCE WITH THE NEW CELERY CULTURE.

We have had quite a little experience with the new method of growing celery, and found that it was a good plan to make a small beginning; for no one seems to be able to comprehend the amount of water that it requires. As our patch was right about a good well at the barn, we put in a rotary pump and watered frequently with an engine; but at one end of the patch the water ran into it from a leaky watering-trough, keeping the ground soaked up all the time. If it had not been for this we should not have known the possibilities of the plan, as the celery was wonderful in this spot, and I should say the most profitable thing on the place. While with good watering the crop was fair, it was not nearly what it should have been, and did not blanch up as nicely as that banked. The requirements seem to be to keep it growing right along, having the ground immensely rich, and not stopping the watering because it may have rained, but put on ever so much more, until the ground is all soaked up, and then in a few days put it on just as heavy again, and keep it right up till the celery is ready to market. It will grow in a wonderfully short time; and if one has plenty of water there need be no failure about it at all, and it will surely be a big success if that and the manure are attended to. Even where the celery was only fairly good, we sold at 10 cts. a bunch, putting three in a bunch, sometimes four. This is at the rate of over $3000 for the crop of an acre. We wished we had all celery for a while; but then, it would have needed to be better than this was, or we could not have sold so much of it.

CHRISTIAN WECKESSER.

Sanborn, N. Y., Dec. 6.

ON THE WHEEL.

On the evening of Thursday, Jan. 11, it was my pleasure to deliver to the Endeavor Society of Sharon Center, this county, substantially the address in Our Homes for this issue. After my talk I passed the night with a friend who lives on one of the highest hills in Medina Co. As business is pressing now at the Home of the Honey-bees, I begged the privilege of getting up at the first glimpse of dawn, for a six-mile tramp to my home before breakfast. The roads were rather rough to use the wheel, but I had a curiosity to see how I could stand such a tramp since my lungs and muscles have been so well developed by my wheel-riding. I made it easily, and could have tramped back again, I think, without breakfast or without very much fatigue; and I did and do thank God from the bottom of my heart for health, good stout lungs, and, and hardened muscles. But what has this to do with the wheel? Just this: I left my wheel the night before at the depot, half a mile from home. During my walk I had made tests of walking as an exercise compared with wheeling. I walked as rapidly as I could, and then I ran quite a little distance to test my wind; but I did not find the exhilaration that is produced by the wheel. In that last half-mile with the *wheel*, however, and especially in going up hill, I was surprised to notice how quickly the exercise on the wheel brought the long breaths that distend my lungs to their utmost, and with this large lung extension came the strength and exhilaration. I confess I do not understand it. But this seems to be clear: When you are lifted from your feet, and are not obliged to sustain the weight of your body, a set of muscles are brought into play, or a different condition of things takes place, that permits great lung expansion without the fatigue that would result were one obliged to support the weight of the body.

STANDARD TIME.

At present writing, only two criticisms have been received in regard to my article in our last issue, and both of these refer to a blunder of mine. I mentioned a family that were obliged to stay over all day Saturday and all day Sunday because of the confusion resulting from having two kinds of time. I saw them at our depot, and listened while they talked with the agent, and explained to him their loss and disappointment. But I did not at the time notice that, had they taken sun time instead of railroad time, they would have been *ahead* of the train instead of *behind* it. I asked the agent to explain; but all he could tell was that they missed their train because of the confusion resulting from having two kinds of time. Very likely it occurred in this way: Somebody told them that the train left at 9 o'clock, which was true by *sun* time, but they came to the depot to

take their train at 9 o'clock *railroad* time. The agent told me the two kinds of time made confusion continually every day, week in and week out. That is true in our business. The two kinds of time can not but result in confusion. The railroads can not adopt sun time, so called —everybody assents to this; therefore the only way in which one kind of time can be brought about is by adopting standard time, or, in other words, conforming to the spirit of the law that has been made.

KIND WORDS FROM OUR CUSTOMERS.

Of course I want GLEANINGS continued right along, "footnotes" and all. I indorse all that Dr. Miller said about footnotes, and think with him that GLEANINGS is "just perfect.

Bedford, N. Y., Jan. 1. MISS P. E. MILLS.

We received the sewing-machine all solid and sound. It works all right. It is a nice one too. I can not see why any one could object, after receiving one, unless he expected to get a little steam-engine with humanity in it to run it and do the sewing. WM. H. WEISER.

York, Pa.

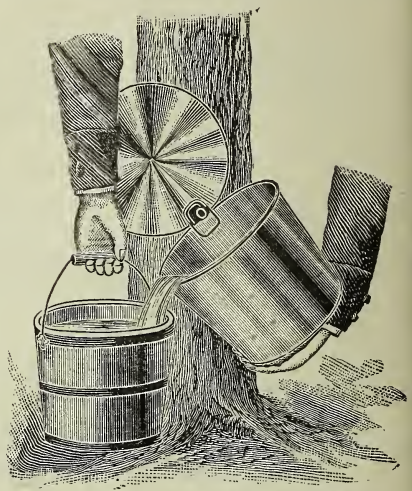
SOME KIND WORDS FROM FRANCE, FOR THE A B C BOOK.

"It never rains but it pours" is no less true of kind words than of misfortunes; at least, such seems to have been our good fortune during the last month. In Stray Straws for Oct. 1 Dr. Miller made reference to an opinion expressed by our esteemed French cotemporary, *Le Rucher* (The Apiary) concerning our A B C book. A day or so afterward he sent us the whole extract. In English it reads as follows:

"We are happy to be able to avail ourselves of the space remaining in this department to acknowledge the receipt of an important book which was gratuitously sent us by the author, and concerning which we have for a long time promised to say something. It is nothing more nor less than the A B C of Bee Culture, universally known by bee-keepers, written by Mr. A. I. Root, the very friendly and obliging editor of GLEANINGS IN BEE CULTURE, which has furnished us more than once the necessary foundation for an article. We have never seen a book so beautiful and so complete on apiculture. The pictures are numerous—so numerous that we have not wished to count them, and they are, for the most part, reproductions in photo-engraving. The plan adopted by the author is very happy. It is the alphabetical arrangement of all the articles; 400 pages of faultless presswork, treating, so as to speak, on every case which can occur in apicultural experience; a description of the implements which have been most nearly perfected, and the latest inventions; the manner of making hives, sections, etc. Such is this book, which, in its entirety, has no equal. It winds up with a biography, with half-tone pictures of the most eminent bee-men, and of photographic views of several important apiaries. Our heartiest thanks are due to our confrere Mr. Root."

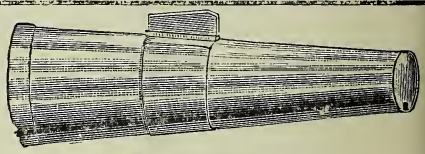
Maple-Sugar Supplies.

The time is at hand when those who produce the delicious sweets from the sugar maple must be getting ready. For the best results you must have good clean apparatus of the most approved type, and you really can not afford not to read Prof. Cook's book, "Maple Sugar and the Sugar-bush," which we furnish at 35c, or we will give a copy free to all those who buy sugar-makers' supplies of us to the amount of $10.00 or more. We do not sell evaporators, but we think we can do you some good on spouts, pails, covers, and cans. We have received a carload of these from the factory, and they are made of American tin-plate. The plates are tinned and made up into cans by the same firm; and by taking a carload we get them at bottom prices. See table below. The pails and cans are machine-made, far superior to hand-made, and guaranteed not to leak.



BUCKET WITH HINGED TIN COVER.

This cut shows the manner of hanging the bucket on the spout, and also the manner of emptying with the hinged tin cover. Most progressive sugar-makers nowadays use covers of some kind.



RECORD SAP SPOUT.

This spout is cheaper than any other made, and we believe it is as good as any, if not better. It is used almost exclusively in this section.

PRICE LIST OF PAILS, COVERS, SPILES, ETC.

	IC tin.	IX tin.
10-quart bright tin buckets, per 100	$15 00	$17 00
12 " " " " "	16 00	18 00
15 " " " " "	18 00	21 00
Patent hinged tin covers, per 100	$6 00	
Wood Reversible covers, per 100	4 50	
Record say-spouts, per 100	$1 00; 1000 for	$8 00
1-gal. sq. cans "	11 00	
1 " " " 6 in a box, per box.	$ 90; 10 boxes	$ 8 50
1 " " " 10 in a box, per box.	1 40; " "	13 00
5 " " " not boxed, each	3.; 100	26 00
5 " " " 2 in a box, per box.	75; 10 for.	7 00
5 " " " 1 in a box, per box.	45; 10 for..	4 20

A. I. ROOT, MEDINA, OHIO.